

# OCEAN RESEARCH AND EDUCATION SOCIETY, INC.

















## THE RESEARCH

The primary objectives of the Society are centered in scientific research reflected in the study of oceanography, marine mammals, sea birds and the ecology of ocean systems.

The basis of most of this scientific research in the ocean done by the Society includes the collection of oceanographic data of various physical and biological aspects of water masses the ship passes through. The study of the behavioral ecology of humpback whales, fluke identification, migratory tracking, and the identification of feeding communities, is also a part of successful research done by the Society. Other marine mammals, such as other whales, porpoises and dolphins, are also objects of study by the Society.

For example, during each of two recent research cruises, students and scientists aboard the REGINA MARIS spent six weeks studying the dynamics of feeding communities in the Gulf of Maine. Humpback and other whales, as well as sea birds, were used to locate areas of high biological productivity. Studies of these areas examined physical, chemical and biological aspects of the water column as a first step toward understanding the dynamic interrelationships between the various species and their environment.



Plankton nets are readied by students and scientists to gather biological information.



A humpback whale surfaces next to the ship on one of the Society's research expeditions.

During the research cruises held annually near the Dominican Republic, scientists examine coral reefs and ocean habitats characteristic of tropical areas, as well as making an annual survey of Silver Bank for the humpback whales that breed and have their calves there.









As a part of O.R.E.S. commitment to conduct valuable scientific research, the Society often provides the vehicle for research and study for visiting scientists, who conduct research on such varied topics as the Cat Island Turtle, the Leatherback Turtle of the Dominican Republic, the distribution of shore plant seeds by ocean currents, and the population dynamics of the Bahamian Hutia, a highly endangered rodent endemic (occurring only in the area) to a single small island in the Bahamas.

The list of publications of the Ocean Research and Education Society currently number about fifteen scientific publications. Numerous scientific papers reporting research done by the Society are always underway, as well as the routine reports of research activity that appear in the *O.R.E.S. News*, which is distributed to members and associated scientific concerns on a quarterly basis.

Additionally, a program is being developed by the Director of Education for O.R.E.S., Dr. Larry Lewis, which, when implemented, will provide support for senior staff scientists by hiring postdoctoral scientists. The goal of this new program will be to create two distinct research teams out of the current four

independent scientists. The productivity of two teams should be greater than four individuals working in isolation, and will provide training in research and in teaching for the postdoctoral scientist.

As well, the Society is in a unique position to be a vital part of the training of marine scientists by providing the sea time, guidance and students necessary for this work. At the same time, postdoctoral scientists can provide the Society with the stimulation of new ideas necessary for a creative research effort.



Students actively participate in research work aboard the ship.

Student participation in the scientific research of the Society is also an important facet of O.R.E.S. work, and takes place, primarily, during the second six weeks of the Society's academic program at sea aboard the REGINA MARIS. Students participate as research assistants in the Society's ongoing work, by applying knowledge gained during the first six weeks in the classroom and laboratory. Students carry out individual and group research projects that are a component of the overall research objectives of the expedition.







The work with Humpback whales is designed to look at three questions:

1. How many animals are included in the North Atlantic population?
2. Where are these whales located during different seasons?
3. What is their pattern of migration?

When this work was begun, animal counts were obtained by sailing a fixed track at a constant speed and counting all animals spotted within a certain range — the line transect census method. At the same time, photographs were collected of the humpback whale flukes (the tail), which have pigment patterns unique to each whale, much as a fingerprint is unique to a specific man. These can then be used to identify each animal individually.



In the scientific research of whales and migration patterns, it is important to pool such data with those collected by other scientists to obtain the most accurate information. This work has been pursued in collaboration with several groups, which together, have created a computerized data base program for fluke identification and recording which includes over 3,500 whales.

Pictures of the fluke are taken as each whale is sighted, and a match is attempted by recalling information from the computer data base (such as pattern of color, scars, and other identifying marks) that would allow for a match.



Two things have come from this identification work: First, it is now known that while the entire Western North Atlantic Humpback Whale population uses Silver Bank in the south (near the Dominican Republic) as a breeding ground, this population splits up into discrete sub-populations each of which goes to a specific feeding ground in the summer. Secondly, now that a significant portion of the total population can be identified, the total population can be identified, the population in a given area can be estimated by simple probability calculations.



The work near Greenland is often cold and wet.

The West Greenland Humpbacks were chosen for study recently to determine the following things:

1. Is this group another discrete feeding population?
2. How does this population relate to other feeding populations?
3. Does this population use Silver Bank to breed?
4. How large is this population?
5. What effect does the ongoing aboriginal "harvest" of ten animals per year have on this sub-population and the population of the North Atlantic as a whole?









The "arch" in the foreground is the jawbone of a humpback whale harvested in an aboriginal hunt in Greenland.

In the first year, 1981, three of the fifty animals identified had been seen before at Silver Bank. Population estimates, though crude and limited by such a small sample, were nevertheless, disturbingly small, and suggested that a continued "take" of ten whales per year could be in excess of what such a small discrete population could sustain.

Similar results were obtained in 1982. Unfortunately, bad weather and ice severely limited the ability to work in both 1981 and 1982, so that only one of several areas popular with the whales (and their hunters) could be examined. Even so, the first year's findings were confirmed and reported to the Danish Government and the International Whaling Commission, (the Commission sets the quotas for aboriginal hunting) with a letter stating that further work would be needed to draw any firm conclusions on which action could be based.

Better weather and less ice, in 1983, allowed the Society's expedition to collect the needed data by covering a larger area of the coast. New population estimates, providing numbers 50% larger than previously obtained, confirmed that the humpback whales on the West Greenland coast are all part of the same sub-population. More importantly, it was confirmed that the aboriginal "take" of ten animals per year probably was sustainable, barring any natural cataclysm, epidemic, etc. The Danish Commission on Scientific Research in Greenland is sponsoring ongoing monitoring and surveillance of this population needed to monitor the aboriginal hunting that occurs there, using the methods developed by the Society.

The Society plans to continue to explore the migration patterns, feeding communities and breeding habits of the humpback whale population in the Atlantic ocean,

and continues its efforts to increase the data available on these populations, by searching for the oceanographic and biological features critical to the continuing use of a given habitat by whales.



The REGINA MARIS sails by a glacier off the coast of Greenland, on one of her research cruises.



Students and scientists continue the collection of data, which will be used by a number of other scientific groups.

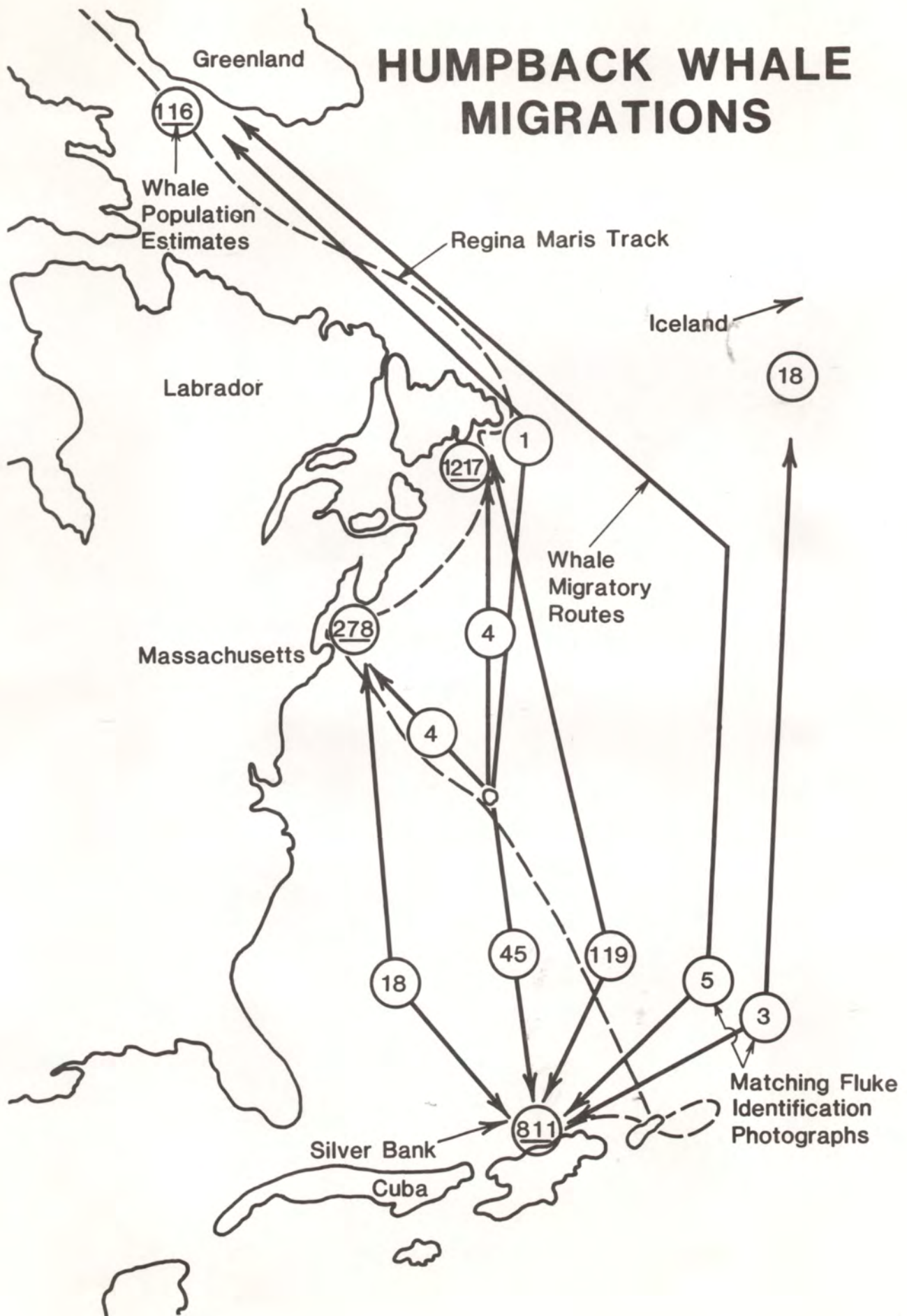
Today the Society continues its research on the population ecology of whales, which includes the collection of oceanographic data. The data collected are shared with a number of other scientific groups via a cooperative arrangement called the Western North Atlantic Whale Research Association (of which O.R.E.S. is a founder).







# HUMPBACK WHALE MIGRATIONS

















## THE EDUCATION

In addition to the Society's research efforts an extensive and unusual educational program designed to offer students of marine life a unique opportunity to study marine mammals and ocean ecology while participating in ocean-going research is conducted.

Six times a year, the Society offers the Sail and Study semester programs in marine studies. These semester programs are alternative educational programs for college students interested in the marine world, whereby a full semester of credit (15 hours) is available for students enrolled in these 12 week expeditions. Six weeks are spent ashore at the classroom and laboratory in Gloucester, Massachusetts. Courses include: Marine Mammal Biology (and Lab), Oceanography (and Lab), Introduction to Nautical Science, and Integrating Marine Seminar (includes the history of oceanography and current marine management issues). Much of the work done ashore is designed to prepare the student for field research work.

Immediately following the on-shore class work, students sail for six weeks aboard the Society's oceanographic research vessel, REGINA MARIS, on one of her regular working voyages. While on board, students assist the scientists with ongoing research projects, and work with REGINA'S professional crew in all aspects of the ship's operation. Students carry out individual and group research projects that are components of the overall research objectives for that particular expedition. Each student designs and prepares a proposal for their portion of the research task in conjunction with one of the staff scientists. Students collect and analyze original data and prepare written reports on their findings. In addition, students participate in a seminar series while on board the vessel.



Students work together on oceanographic research efforts aboard the REGINA MARIS.



The classroom at O.R.E.S. headquarters in Gloucester, MA.

For the first six and a half years, the teaching and research effort was conducted entirely at sea. Students joined the ship for six weeks to help sail the vessel and collect primary research data. A formal program of courses in marine mammal biology and topics in oceanography was taught aboard. Academic credit at the college undergraduate level was available for those who successfully completed the academic work via the University of California at Santa Cruz.



An O.R.E.S. scientist gives a lecture during a research expedition.







At first, only one scientist was employed full time, and the rest of the research and teaching was done by volunteers and visitors from other institutions. In the summer of 1980, a second full time scientist was engaged to expand the base of research, and an education specialist was recruited to strengthen and enlarge the teaching efforts.

While this arrangement made a good beginning, it also had some drawbacks: The average student required one-third to one-half of his time aboard to learn enough about the work and the ship to begin to take advantage of the opportunities available, and to be of help to the scientists. The program then only offered one-half a semester of college credit — a fact which made it difficult to fit the program into a standard academic plan. As well, the total amount of student tuition was restricted (by the size of the ship) to a level such that, in order to be competitive, no more than 60% of the funds needed to operate could be collected. This meant that the financial state of the Society was dependent upon the generosity, at the time, of one or two liberal donors, until such time that grant support might be obtained.



To solve these problems, the Society expanded its teaching to include a program of classes ashore that were designed to prepare the student for time aboard the ship as an active research assistant. By making the shore component the same length as the ship expedition, simultaneous classes — one ashore and one afloat — could be taught, thus doubling the enrollment and the tuition income. In order to implement this plan, a facility was needed which would provide classrooms and laboratories as well as office space for administrative work. As well, some staff changes would be required to handle the simultaneous classes on shore and on board.

During 1982, a new twelve week curriculum was designed containing six weeks of classes and laboratories ashore in preparation for a final six weeks of field experience aboard the ship. A new headquarters for the Society, including the needed

classroom and laboratory space for students, a dock for the ship, and staff offices was located in Gloucester, Massachusetts. And, finally, two more scientists were added to the staff.



Students practice emergency procedures aboard ship.

The classes that have been completed in the shore program since this new curriculum was initiated on February 1, 1980, have confirmed the best hopes. When students arrive aboard the REGINA MARIS now, they know what to expect and what is expected of them. Each comes aboard with an individual research project, knowing what kind of equipment is needed and how to use it to complete the project. In addition, students know what role they will be expected to play in the development of the overall scientific program of that particular voyage. As well, this new curriculum provides a full semester of academic credits (15) from the University of Massachusetts at Amherst.











Students record and analyze research data aboard the ship.

Present experience suggests that 30% of the students, or 40 out of 132, need major financial help each year. Recognition of these problems led the Society to provide scholarship aid at the rate of about \$25,000 each year. Of this amount, not more than \$2,000 to \$4,000 has been covered by actual cash donations to the Society. The rest has been provided by "forgiving" varying fractions of the student's tuition, which is currently \$5,100.

Since the discounting procedure used to provide scholarships is ultimately self-defeating, the Society has been actively soliciting grants and cash donations that will fund a continuing and stable scholarship program.

In measuring the success of the Society these first eight years, the Society can boast over 700 enthusiastic students, ranging in age from 17 to 66, who have successfully completed the program. A reputation for conscientious, well-designed, hard work in cetology

(the science of whales) has been established. From this, eleven publications have been contributed to scientific literature under the Society's name. Membership has expanded from a low of 350 to over 1,000. Funding for research (both grants and contracts) has been obtained in small, but useful amounts, from the National Marine Fisheries Service, World Wildlife Fund - U.S., National Audubon Society, Massachusetts Audubon Society, International Whaling Commission, The Commission for Scientific Investigations in Greenland of the Danish Government, New York Zoological Society, and the Bermuda Aquarium.

Currently, the Society holds six classes per year, and fills those classes roughly six months to a year in advance of the actual class date. Working seven classes a year would be well within the capability of a new vessel, since the maintenance time would be considerably less than what it is for the REGINA MARIS, and would thus contribute educational opportunity to a greater number of students.



Students help hang a new sail while the REGINA is out at sea.

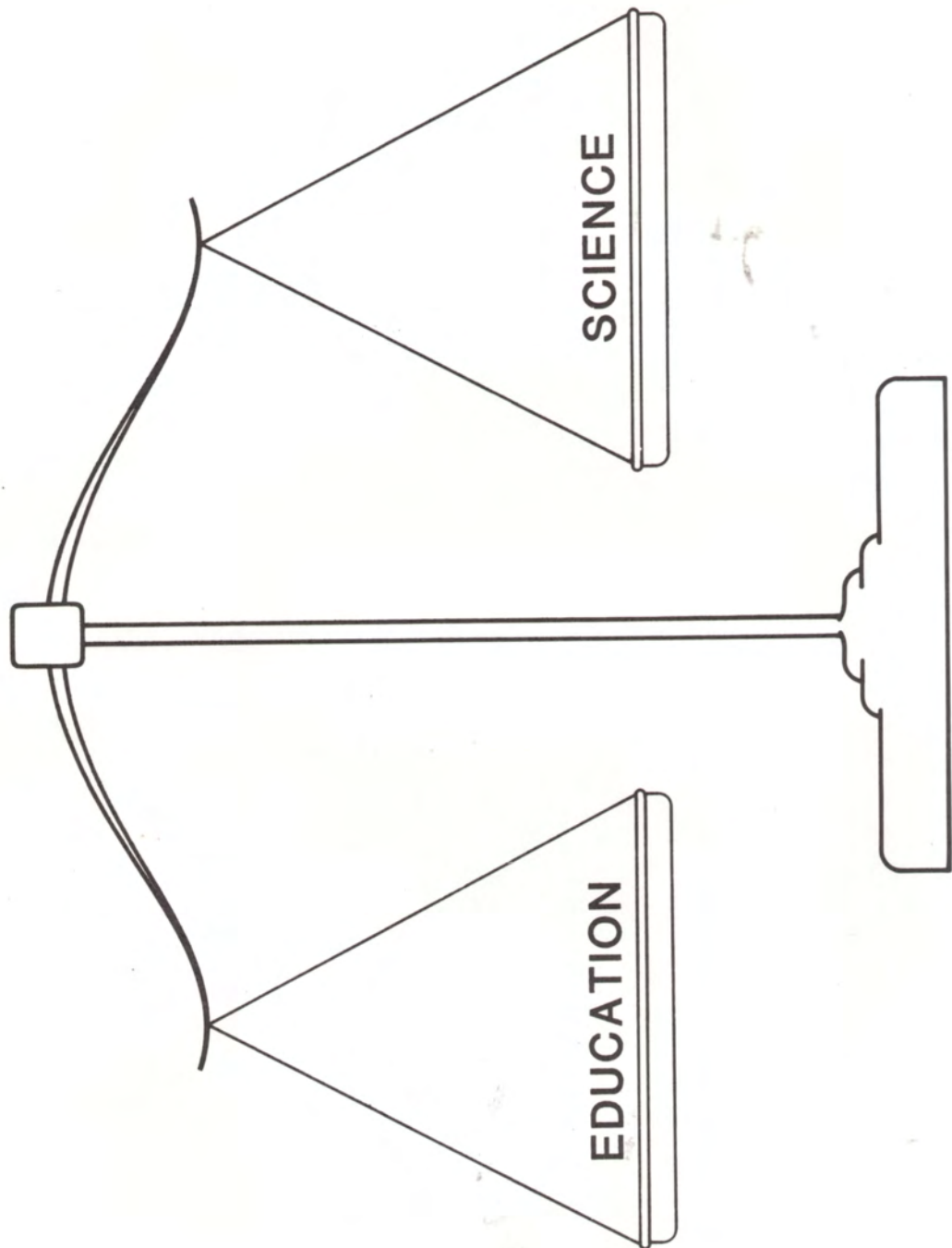


Students enjoy a social time below deck.























## THE COMMUNITY

Both the scientific research and the education programs of the Society are intended to explore far-reaching consequences of our interactions with the sea. Contemporary marine issues, the historical roots of today's view of the ocean, and the scientific, technical, political, economic, and personal frontiers that the sea provides are explored.

A third part of the Society's goal is to create a well-informed constituency concerned with the oceans and the problems surrounding the proper utilization of their resources. Interested individuals are invited to become involved in the Society's work by becoming a member, participating in the research expeditions when space is available, attending land-based programs and supporting the Society with voluntary contributions of cash, goods or services. Members support the Society in three ways: Their dues provide a small, but reliable income; their voluntary contributions help support scholarships, ship repairs, the Society's library, and other ongoing programs; and as interested participants in the work of the Society, they spread information about the Society, which brings in more students, members and contributions.



A visitor to the ship enjoys a day on the REGINA MARIS.







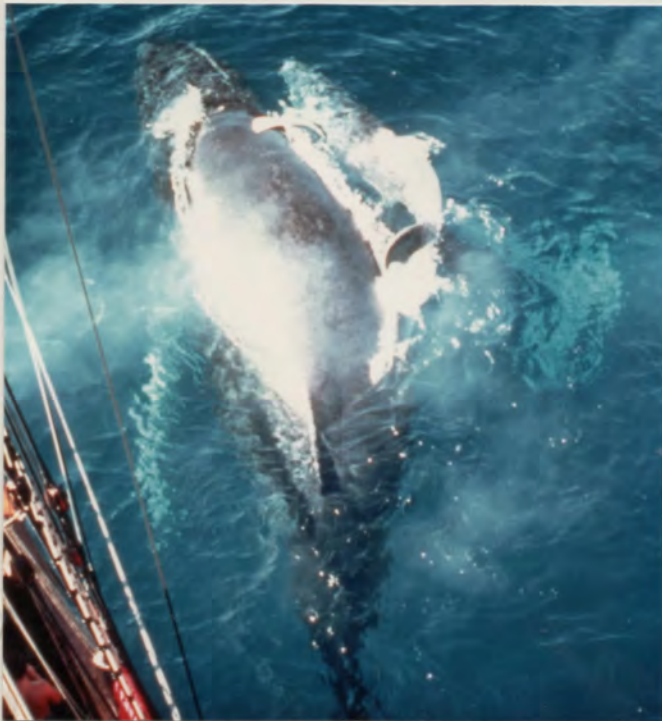


Most members are gained by direct mail solicitation. By mailing about 75,000 pieces of information about the Society each year under the direction of a direct mail consultant, a return of about 1% is expected. Each new member costs about \$20 to acquire, and another \$4 to service with mailings, etc. for an average gain of about \$1 from the \$25 membership fee. About 50% of new members renew for a second year.

Members receive two publications. SEARCHLIGHT is a biweekly report drawn from the ship's log, and keeps members informed of the scientific work being done on board the REGINA MARIS. O.R.E.S. NEWS is a quarterly newsletter which features educational articles about whale research, and other timely topics in marine biology and oceanography.



The Society also provides organizations, schools, and citizen groups with a variety of workshops, lectures, and courses on whales. The Society's staff have acted as consultants to various groups in curriculum and research design, and various whale related activities.



Two whales are sighted off the side of the ship.



Community classes are an important part of O.R.E.S. work in the Gloucester area.

The Society is unique in Gloucester since it is the only institution in the city currently regularly offering higher level education. The focus on marine biology is particularly appropriate since fishing remains a major industry in this area. The Society's relationship with Suffolk University and the Five Colleges Consortium, (University of Massachusetts, and Amherst, Hampshire, Mt. Holyoke and Smith Colleges) as well as a number of other colleges and universities in New England provides the Society with significant impact in the whole area. Indeed, this impact is reflected by the large proportion of students who come from this region to attend the Sail and Study classes.

In the Gloucester area, the Society sponsors a public lecture series, held through the summer at the O.R.E.S. classroom and laboratories. These lectures are intended to provide information to interested community members about various marine issues. The Society's staff, along with visiting speakers from nearby colleges, research institutions and industry, conduct these lectures. Other courses in various marine sciences, designed for adult or continuing education are planned for the near future.









Ocean Research and Education Society  
**FALL PUBLIC LECTURE SERIES**  
**1984**

**WHALE CONSERVATION PROBLEMS  
AND SOLUTIONS**

**September 27**

Finback and Humpback Whales: Population Studies  
Dr. Charles (Stormy) Mayo  
Center for Coastal Studies

**October 4**

Whale Standings on the East Coast  
Ms. Pat Fiorelli and Mr. Greg Early  
New England Aquarium

**October 11**

Sperm Whales in the Indian Ocean  
Dr. Hal Whitehead  
Whale Research Group  
Memorial University of Newfoundland

**October 18**

Status of the Right Whale  
Dr. Howard Winn  
University of Rhode Island

Seminars will begin at 7 P.M. at The Ocean Research and Education Society, Inc.  
19 Harbor Loop, Gloucester, MA

Free to Members of the Ocean Research & Education Society and college students with valid I.D.  
Non-members Suggested Donation - \$2  
*Refreshments will be served.*







**Ocean Research and Education Society**  
**19 Harbor Loop Road, Gloucester**  
**617-283-1475**

**FALL — 1984**  
**EVENTS, CLASSES, AND**  
**PUBLIC LECTURES**



The Ocean Research and Education Society is a nonprofit, educational membership society born from a conviction that knowledge and appreciation of the oceans must be expanded if its resources are to be conserved for future generations. Since 1975, the Society has had three goals:

- 1) to expand our understanding of the oceans and its inhabitants by means of an open ocean research program based upon the *r/v Regina Maris*;
- 2) to offer college students an alternative educational experience; and
- 3) to create a well-informed constituency concerned with the oceans and the problems with the oceans and the problems surrounding their preservation.

In this spirit, we offer the following:



## EVENTS

### **SEPTEMBER 12 — Meet ORES**

Register for adult education courses and the seaweed supper. See tapes prepared for national television of *Regina*. Learn the history of ORES. Have refreshments and meet our staff and students. Wednesday, 7-9 p.m.

### **NOVEMBER 14 — Seaweed Supper**

An exotic and unique meal will be prepared by Ms. Linda Parker. Dine on the likes of curried kelp and tiger moss chutney. A special event for the vegetarian in each of us. A maximum of 20 persons. Wednesday, 7 p.m., \$6 (\$5 for members).



## ADULT EDUCATION CLASSES

### 1. SEPTEMBER 22, 29 and OCTOBER 6 — Wild Flowers by the Edge of the Sea

Flowering plants, gymnosperms, and ferns will be collected from selected sites on Cape Ann. The ecological problems of land plants that live near the sea will be stressed.

Mr. Andrew DiLido holds the M.S. in Botany from Ohio State University. He has served as an instructor in botany at Ohio State and Suffolk Universities. His research has included electron microscopic studies of pollen and spores of higher plants.

Three Saturdays starting September 22, 9-12 noon. \$54 (\$45 for members).



**2. OCTOBER 22, 29, and NOVEMBER 5 — Sea Vegetables:  
Collection & Preparation**

Learn to identify, harvest and preserve our Cape Ann seaweeds. Then learn to prepare them in an appetizing and nutritious homestyle manner. Students should plan to lunch at ORES on the soups, salads, snacks, and main dish fare made during the morning.

Ms. Linda Parker, proprietor and co-founder of the Cape Ann Seaweeds Company, has been teaching seaweed cookery and foraging for the last five years through Boston area food cooperatives, the Dogtown Lyceum, and the Peabody Museum.

Three Mondays starting October 22 between 2-4 p.m. (collection at the low tide of the day). Otherwise, preparation will occur between 10-12 noon. \$36 (\$30 for members).



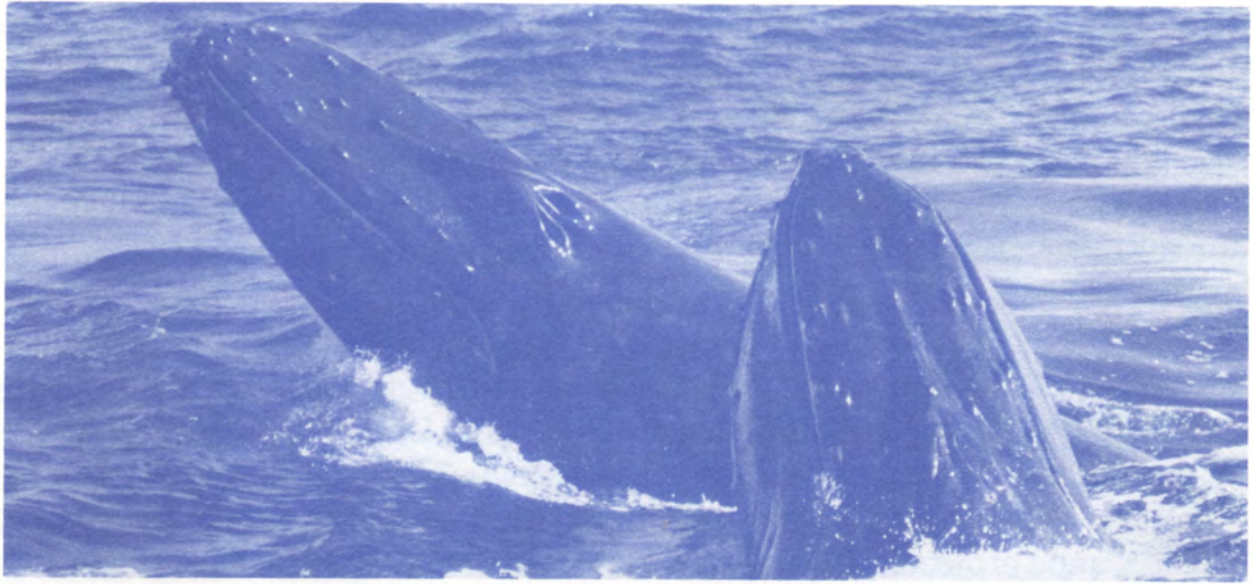
**3. SEPTEMBER 24, 29, OCTOBER 1, 8, 15, 22 — Whales, Seals and other Furry Creatures of the Deep**

The world of whales, walrus, seals, and otters will be explored in ten hours of lecture and a whale watch. Life histories, ecological patterns, and conservation issues will be explored. Students will learn to identify the local species of whales. The classes will benefit from ORES' extensive slide collection and demonstrations of actual skeletons.

Mr. Kevin Chu has a B.A. from Swarthmore College and a M.S. from the University of Connecticut. Mr. Chu is a Teaching Fellow in our Marine Mammal course for college students. He has studied whales in Greenland and has served as naturalist for whale watches of the New England Aquarium.

Five Mondays starting September 24, 7-9 p.m. Whale Watch on September 29. \$85 (\$75 for members) includes the fee for the whale watch.





(Photo by K. Balcomb)



#### **4. NOVEMBER 6, 13, 20, 27, and DECEMBER 4 — Celestial Navigation**

In five weeks, this course will help to provide the landperson with the skills and confidence needed to accurately determine a ship's position at sea. The use of the compass, piloting, dead reckoning, and celestial navigational theory are first discussed. Students will then "shoot for the stars." Practical problems involving the sun, moon, planets, and starsight will be considered. If you can add and subtract, you will determine latitude at noon and in the evening by using the north star. Students who perform satisfactorily will receive a certificate by ORES.

Mr. Terry Linehan holds a B.A. and is a college instructor in Nautical Science at ORES. Mr. Linehan has sailed in Operation Drake, a recreation of the voyage of Sir Francis Drake. He has served as an administrator for the American Sail Training Association. In addition, he was in charge of the Tami Island Canoe project in Papua, New Guinea which resulted in the recreation of the lost maritime technology of a primitive culture.

Five Tuesday evenings starting November 6, 7-9 p.m. \$100 (\$90 for members).



**5. NOVEMBER 7, 14, 21, 28, and DECEMBER 5 — Shore Life in the Fall**

Marine life on Cape Ann will be explored in a series of lectures, labs, demonstrations and short field strips. Special attention will be focused on the ecology of intertidal organisms living on rocky and sandy beaches. Local environmental problems will be discussed. Bring your rubber boots!

Ms. Margaret Day has B.A. from the University of Vermont and a M.S. from the University of Victoria. Ms. Day has been a Research Assistant at Harvard University and the New England Aquarium. Her research interests have focused on mussels, killifish, and octopus.

Five Wednesdays starting October 5, 3-5 p.m.



## NOTES



# **FALL PUBLIC LECTURE SERIES — 1984**

## **WHALE CONSERVATION: PROBLEMS AND SOLUTIONS**

**September 27**

Fin Back and Humpback Whales: Population Studies  
Dr. Charles (Stormy) Mayo, Center for Coastal Studies

**October 4**

Whale Strandings on the East Coast  
Ms. Pat Fiorelli and Mr. Greg Early  
New England Aquarium

**October 11**

Sperm Whales in the Indian Ocean  
Dr. Hal Whitehead  
Whale Research Group  
Memorial University of Newfoundland

**October 18**

Status of the Right Whale  
Dr. Howard Winn, University of Rhode Island

Seminars will begin at 7:00 p.m. at Ocean Research and Education Society, Inc.  
19 Harbor Loop, Gloucester

Free to members and college students with valid I.D. — Non-member Suggested Donation - \$2  
Refreshments will be served.



## REGISTRATION FORM FOR ADULT EDUCATION COURSES

I have enclosed \_\_\_\_\_ to cover the full cost of the following:

_____ Individual Member (\$25) Family Member (\$50) Patron (\$100)		(Members)
_____ Wild Flowers by the Edge of the Sea	\$ 54	\$45
_____ Sea Vegetables: Collection and Preparation	36	30
_____ Seaweed Supper	5	5
_____ Celestial Navigation	100	90
_____ Whales, Seals, and Other Furry Creatures . . .	85	75
_____ Shore Life in the Fall	60	50

Name \_\_\_\_\_ Tel. # \_\_\_\_\_

Address \_\_\_\_\_

All classes are held at Ocean Research and Education Society, 19 Harbor Loop, Gloucester, MA 01930.  
Telephone (800) 447-2022 (in Mass. 283-1475) if you have any questions.

Mail this form along with your check to: O.R.E.S. ADULT ED., to the above address. Payment must be received two weeks prior to the start of each class. There is a minimum enrollment of six.













The night before setting sail, the REGINA MARIS is tied at the O.R.E.S. dock in Gloucester, MA.

## REGINA MARIS

The REGINA MARIS, a 144-foot, three masted wooden barkentine, fills a very critical role in the work of the Society. The continued dependable and safe operation of the REGINA enables the Society to conduct valuable research, while providing a unique educational forum for approximately 130 students a year.

Launched in 1908 as a three masted schooner, the REGINA MARIS was the 100th hull built by J. Ring Andersen in Svendborg, Denmark. For a number of years, she carried general cargoes around the North Atlantic, and later sailed mostly North European waters delivering the phosphates brought to the Elbe from the Pacific by the great windjammers.

In 1930, a diesel engine replaced her sails. She continued carrying cargo around Europe until a fire nearly sank her in 1963. Siegfried and John Aage Wilson of Arendal, Norway, bought the hull, rebuilt her as a barkentine, named her REGINA MARIS, and set off on voyages which included a circumnavigation, and a voyage to Australia via Cape Horn.

O.R.E.S. bought REGINA MARIS in Greece in 1976, and refitted her for oceanographic work in Gloucester, Massachusetts. Since July, 1976, she has sailed in the North Atlantic from Greenland to Venezuela and in the eastern Pacific from the Galapagos Islands to southeast Alaska doing research on whales and other marine life.





# STUDY MATERIALS

The first part of the study material is a review of the basic concepts of the subject. This is followed by a discussion of the various methods used in the study. The third part of the study material is a summary of the results of the study.

The second part of the study material is a discussion of the various methods used in the study. This is followed by a discussion of the various results of the study. The third part of the study material is a summary of the results of the study.

The third part of the study material is a summary of the results of the study. This is followed by a discussion of the various results of the study. The fourth part of the study material is a summary of the results of the study.

The fourth part of the study material is a summary of the results of the study. This is followed by a discussion of the various results of the study. The fifth part of the study material is a summary of the results of the study.





Her tall masts provide ideal platforms from which to spot animals and observe their behavior, while her stability at sea makes her an ideal ship from which to handle nets and other oceanographic gear.

Though the REGINA MARIS has served the Society well, it has become increasingly apparent that the time is approaching when the REGINA must be retired. The age of the ship brings mounting maintenance and insurance costs, and requires costly and extensive inspections every two years to certify seaworthiness.

Lloyd's Register of Shipping requires a special inspection of all vessels over ten years old every fourth year, with annual visual inspections between. They also supervise any repairs that are made between inspections. Due to the REGINA'S age, two years ago, the schedule of special inspections was updated for the REGINA MARIS to every two years with annual visual inspections between.

Special inspections vary considerably in their intensity. If a ship is older, like the REGINA, it is the privilege of the inspector to request that she be nearly dismantled for inspection and testing of all her component parts.



Planks on each side of the ship are removed for inspection.



An inspector checks the REGINA MARIS during a biannual inspection.











Craftsmen, skilled in work on older, wooden ships, are hard to find.

For the survey that is scheduled for 1985 on the REGINA MARIS, Lloyd's has informed the Society that they will require removal for inspection, all tanks, the first plank on each side of the keel on the bottom for the entire length of the ship and all three masts. In addition, the forward part of the vessel must be opened up for inspection as well as removing parts of the lining of the engine room compartment.

Removal of the tanks requires removal of the entire internal accommodation (bunks, cabins, etc.). Taking the rig out (the masts and rigging) requires floating cranes, and is probably the most expensive of the work required.

Given this criteria, it is thought that the survey to be conducted in 1985 will cost in excess of \$200,000.

It seems obvious that the REGINA MARIS is due for retirement, and that the cost of operating such a ship is approaching prohibitive limits for the Society. The cost comparisons for insurance, maintenance, and operating costs between a traditional steel sailing vessel, and the REGINA show that there is approximately \$148,500 annual advantage for the Society in operating a new vessel.

	REGINA MARIS (wood)	New Traditional (steel)
Insurance:	\$ 32,500	\$ 25,000
General Maintenance:	\$101,066	\$ 60,000
Bi-annual survey: (½ of \$200,000)	\$100,000	0
Operating Expense:	\$118,921	\$118,921
Annual Totals:	\$352,487	\$203,921

Additionally, the new vessel should provide the means for some additional income (approximately \$115,000) by virtue of housing several additional students per voyage, and by its capability to conduct at least one additional voyage per year. (This still allows for three weeks of maintenance in the shipyard each year.)

Given these numbers, the Society could realize \$268,000 per year in cost benefits and increased income, which would be used to further the research and educational programs of the Society.

In order to realize these advantages, and in keeping with the purposes of the Society, the new vessel should be a fully equipped research vessel, be capable of housing 38-40 people, and be of a traditional sailing vessel design. "Traditional" sailing vessels, while slower than modern sailing ships, are far more comfortable in rough weather because of their greater relative displacement. This not only makes life more pleasant for those aboard, it permits productive work under weather conditions which would require modern vessels to seek shelter.

An additional advantage of a "traditional" sailing vessel is their eye-catching appeal. "Tall Ships", as such vessels are now popularly known, have captured the imagination of the American public since the great parade in New York on July 4, 1976. This appeal has helped the Society in recruiting students and raising funds, and has become a trademark for O.R.E.S.









(The New Ship)









# OCEANOGRAPHIC RESEARCH AND TEACHING VESSEL

## Purpose

In keeping with the purpose of the Ocean Research and Education Society, the new vessel should be a fully equipped research vessel, of traditional sailing vessel design, and be capable of housing 38-40 people. Given the purpose, function, and goals of the Society, the following criteria for design were developed:

## Size:

Length	110 feet, on deck 90 feet, on water line
Beam	25 feet
Draft	11 feet, board up 16 feet, centerboards down
Gross Tons	100
Deadweight Tons	+/- 400

## Construction:

The vessel is to be a traditional style, 3 masted square tops'l schooner. Vessel should be constructed of steel in compliance with American Bureau of Shipping standards for ocean going auxiliary sailing vessels. Watertight bulkheads, stability, etc. should be according to S.O.L.A.S. (Safety of Life at Sea) Convention and U.S. Coast Guard sub-chapter T Rules. Vessel should conform to the 100 gross ton limit. Watertight doors should be fitted in all watertight bulkheads except collision bulkhead for convenient access from one compartment to the next.

The main engine should have sufficient power for cruising at 9 knots in smooth water. Two engines and propellers are preferred for ease of maneuvering.

Auxiliaries include two 15-20 KW 220V AC 60Hz 3 phase; 110V AC 60Hz main power supply. A 24 volt battery bank is required for silent operations, chargeable by either generator. Separate batteries, 12 or 24 volt, are required for radios as per SOLAS rules.

Hydraulic motors to provide power for the anchor windlass, oceanographic winches, and a small winch aft for docking.

A 250 gallon per day (minimum) watermaker, and hot and cold running fresh water in all restroom facilities, galley and lab should be included.

The heating system should provide heating for the whole vessel.

Fuel tanks should be adequate for 3000 miles at cruising speed. Water tanks should have the capacity to hold 1500 gallons. Outboard motor fuel tankage should provide 100 gallon capacity.

## Style and Performance:

The vessel should be good looking, capable of good windward performance, and be able to stay at sea for prolonged periods (35 days) in all weather. It needs to be roomy, comfortable, and capable of reasonable speed under sail and power. Ocean racer performance is not required but the ability to make long passages under sail even in light weather is needed. The ship should have an open unobstructed deck, with full bulwarks for safety.

## Accommodations:

Bunks for 38-40 people should be provided. Accommodations should include two double cabins for scientists sharing a private toilet, one double cabin for two mates, one double cabin for two cooks, one double cabin to accommodate one engineer and one chief officer. These three double cabins can share a toilet. Cabin for engineer and chief officer should include small desks and file cabinets. Accommodations for the Captain should include a double berth, two single berths, private toilet and an office or day cabin easily accessible to the navigation room and wheel. A sea berth for the Captain near the chart room would be desirable. The rest of the bunks can be pilot berths, each to be equipped with storage bin, individual light, small bookcase and curtains for privacy. These can all be distributed around a single large open main cabin lit by skylights containing mess tables for the entire ship's company.







A blackboard facility, projection screen, etc. should be provided since it will also double as a classroom when required.

The galley should be immediately adjacent to this living area with sufficient capacity for dry stores and frozen meats for a minimum of six weeks. A 20 cubic foot refrigerator and 40 cubic foot deep freeze (top opening) should be adequate for these needs.

Each toilet facility should be equipped with a small sink, shower and toilet.

Laboratory should be approximately 12-15 feet by 18 feet, and be located on deck, as a deck house or slightly sunk into the deck. It needs both standing and sitting height lab benches, sinks (two) with water—hot and cold—bookcases, file cabinets and should have easily accessible storage for oceanographic gear. A small darkroom should be included, and have immediate access to open decks.

The chart room on deck should be located aft, accessible to wheel and engine controls and Captain's accommodation. It should contain a chart table, chart book, and instrument storage, navigating electronics and second chart area for student navigators.

Wheel should be aft in the open. Engine controls, speed and depth read outs should be located nearby.

## General

Storage areas will be required for oceanographic equipment, sails, outboards, flammables (paints, solvents, etc.), bosun's supplies and engine room spares.

## Cost Estimates

Hull, Engine, auxiliaries and sails—built in Denmark ..... \$950,000

Life Saving Gear:    four 20-man life rafts ..... 25,000  
                          four Emergency Position Indicating Radio Beacons ..... 1,000  
                          self activating flares ..... 1,000

Small Boats: ..... 12,000

### Navigation and Communication Equipment:

Radar:                Furuno (small) ..... 2,700  
                          Furuno 711 ..... 6,995

Radios:              2 Stevens Engineering SSB ..... 16,000  
                          2 VHF ..... 900  
                          4 hand held portable radios ..... 1,000

Sounders:            Furuno Recording to 2000 fm. .... 3,500  
                          Furuno Color-Chromoscope ..... 3,000  
                          Furuno Side Scan Sonar ..... 14,000

Navigators:         Loran C ..... 4,000  
                          Satellite Navigator ..... 3,000  
                          Wind Speed Meter ..... 1,000  
                          Hull Speed Meter ..... 1,000  
                          Electronic Compass ..... 1,000  
                          Weather Fax Recorder ..... 14,000

Research Gear:      Surface Temperature Sensors ..... 500  
                          Directional Hydrophones ..... 5,000







# Miscellaneous Equipment:

Hydro Winches:	3/16 wire-2000 meter level winder .....	6,500
	One wire-2 conductors, 2000 meter level winder .....	12,000
	2 meter wheels.....	2,000
Articulated Arm Crane:		
	Hydraulic, 20 foot reach .....	12,000
"A" Frames:	.....	3,000



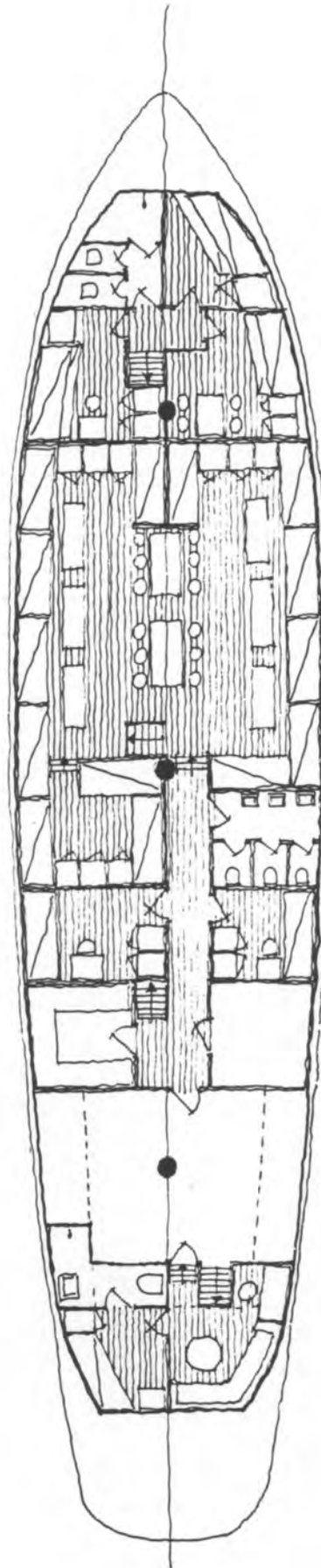
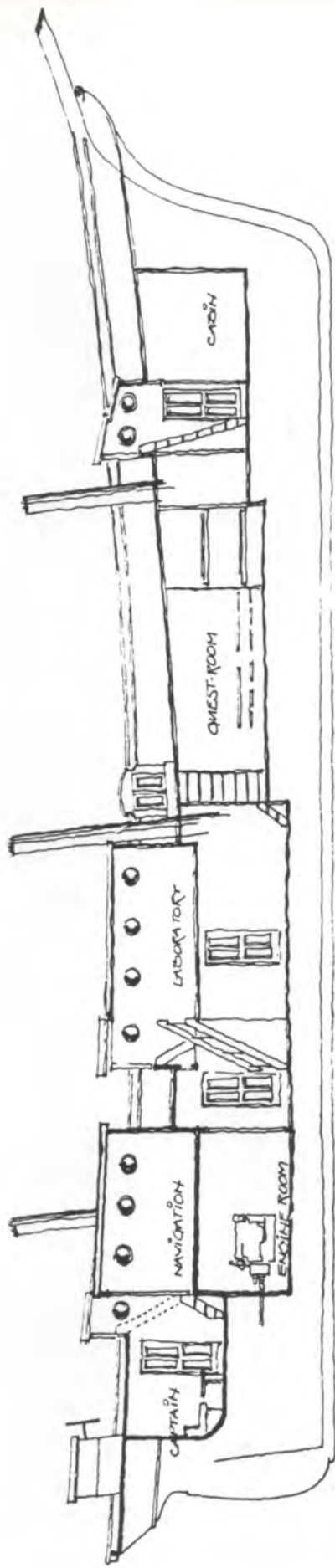
## OCEANOGRAPHIC RESEARCH AND TEACHING VESSEL TOTALS

Hull, Engine, Auxiliaries and sails: (Denmark) .....	\$950,000
Navigation and Communications Equipment .....	66,595
Lifesaving gear .....	27,000
Small Boats .....	12,000
Miscellaneous Equipment .....	33,500
Net Cost .....	\$1,091,095
O.R.E.S. Expenses .....	30,000
Subtotal .....	\$1,121,095
Contingency at 15% .....	168,164
Total Project Cost .....	\$1,289,259









CAPTAIN'S CABIN  
 ENGINE ROOM  
 GALLEY  
 FREEZER FRIG.  
 CREW 4 PER  
 GUESTS 28 PER  
 OFFICERS 2 PER  
 CREW 2 PER  
 CREW 2 PER

SEP. 6. 1984



115 FEET TOP-GALLANT SCHOONER,

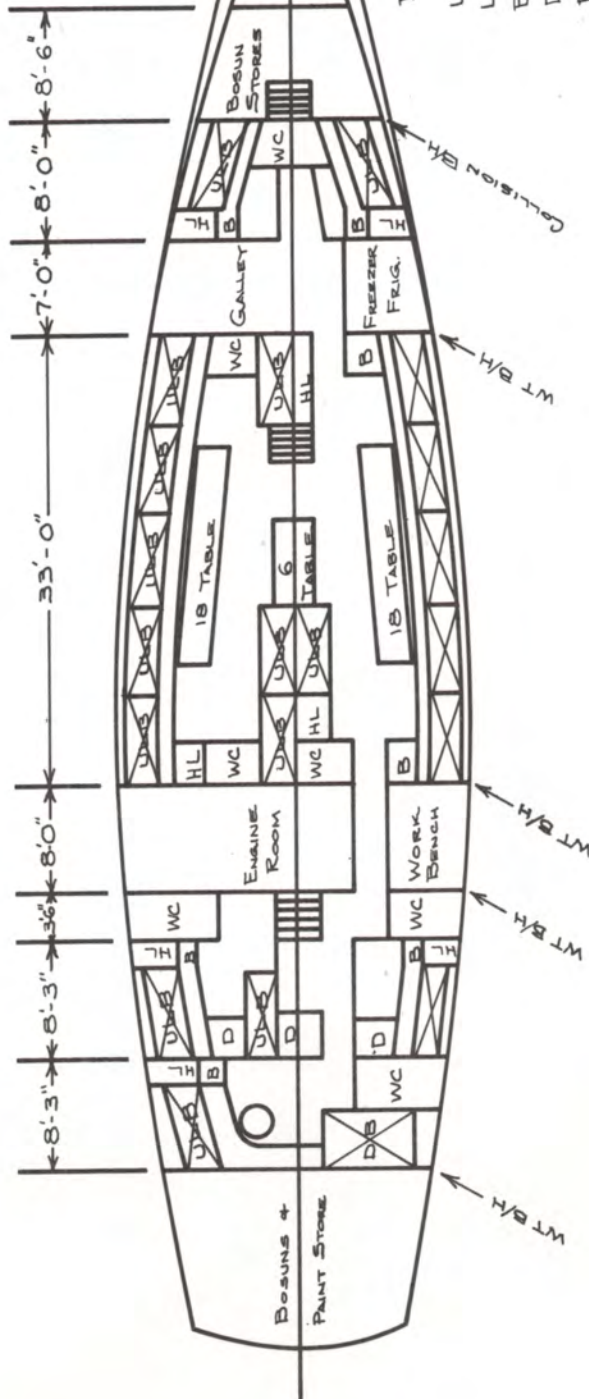
SKETCH FOR OCEAN RESEARCH & EDUCATION SOCIETY INC.







B BUREAU  
 D DESK  
 DB DOUBLE BERTH  
 HL HANGING LOCKER  
 ULB UPPER + LOWER BERTH



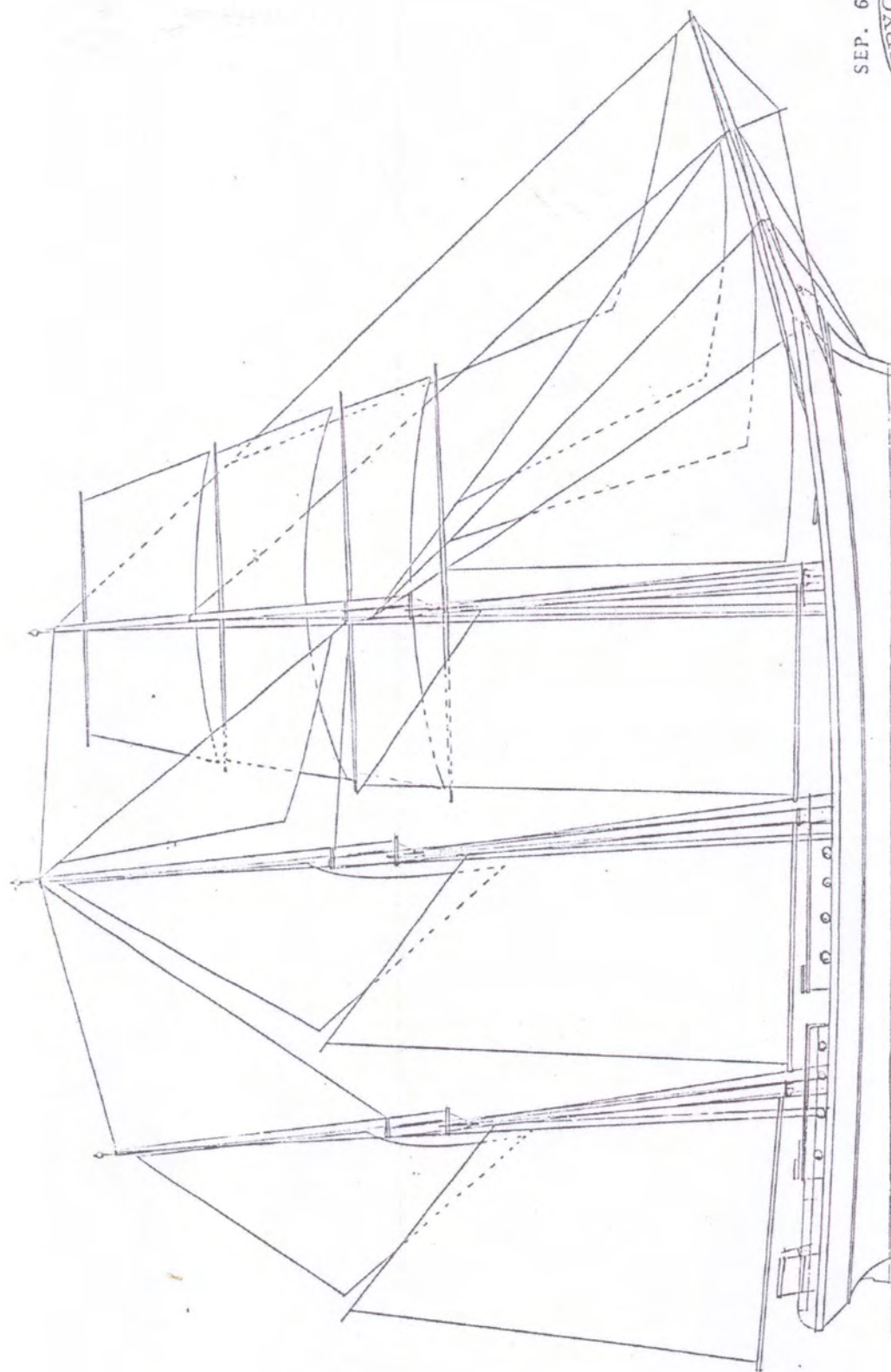
# DIMENSIONS

LOA 116'-0"  
 LWL 85'-0"  
 BEAM 26'-0"  
 DRAFT 10'-0" + 15'-0"  
 DISPLACEMENT 125+ TONS  
 RIG + SAIL AREA 3 MASTED SCHOONER  
 5,000 FT<sup>2</sup> +

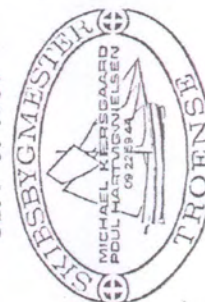








SEP. 6. 1984



SKETCH FOR OCEAN RESEARCH & EDUCATION SOCIETY INC. 115 FEET TOP-GALLANT SCHOONER,

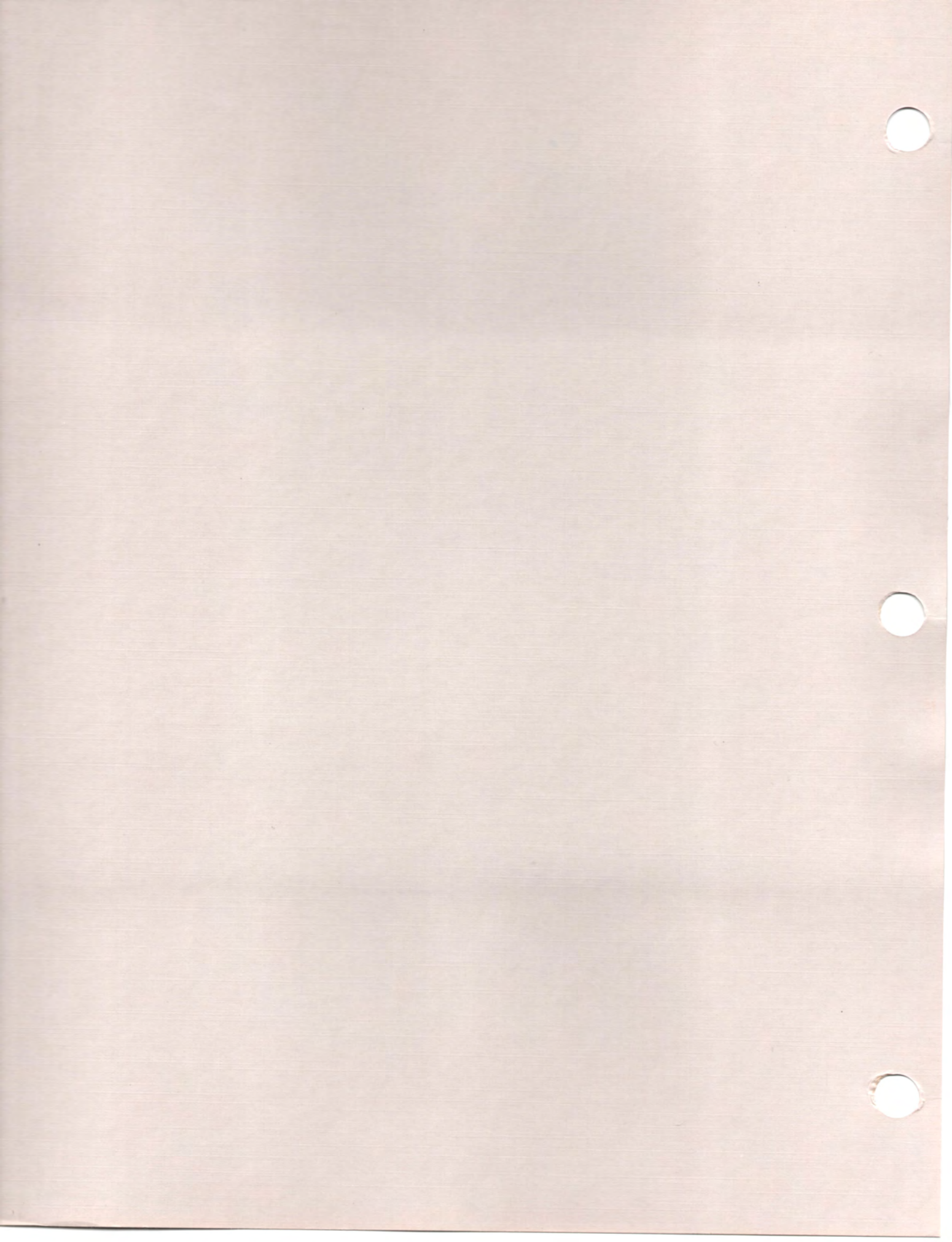














# **PUBLICATIONS OF OCEAN RESEARCH AND EDUCATION SOCIETY, INC.**

## **Western North Atlantic Humpback Whales**

Balcomb, K.C. and G. Nichols. 1978. Rep. International Whaling Commission 28: 159-164.

## **Krill Availability and the Distribution of Humpback Whales in Southeastern Alaska**

Bryant, P.J., G. Nichols, Jr., T. B. Bryant and K. Miller. 1981. J. Mammal. 62: 427-432.

## **Humpback Whale Censuses in the West Indies.**

Balcomb, K.C. and G. Nichols, Jr. 1982. Rep. International Whaling Commission. 32: 401-406.

## **Killer Whales in Greater Puget Sound.**

Balcomb, K.C. III, J.R. Boran, and S.L. Hemlich. 1982. Rep. International Whaling Commission. 32: 681-685.

## **The Atlantic Humpback Fluke Catalog**

Katona, S.K., J.A. Beard and K.C. Balcomb. 1982. Whalewatcher (Journal of American Cetacean Society) 16: 3-8.

## **Humpback Whales (*Megaptera novaeangliae*) off the West Coast of Greenland**

Perkins, J.S., P.J. Bryant, G. Nichols and D. Patten. 1982. Canadian Journal of Zoology 60: 2921-2930.

## **The Cat Island Turtle**

Ross, J.P. 1982. Oryx 16: 349-351.

## **Population Size, Stock Identity, and Distribution of the Humpback Whales off West Greenland - Summer 1981.**

Whitehead, H., K. Chu, J. Perkins, P. Bryant and G. Nichols. 1983. Rep. International Whaling Commission. 33: 497-501.

## **The Leatherback Turtle (*Dermochelys coriacea*) Nesting in the Dominican Republic**

Ross, J.P., and J.A. Ottenwalder. 1983. A.G.J. Rodin and K. Miyata (eds.) Advances in herpetology and evolutionary biology. p. 705-713. Museum of Comparative Zoology, Cambridge, MA.

## **Lagoon Entrance and Other Aggregations of Gray Whales, *Eschrichtius robustus*.**

Norris, K.S., B. Villa-Ramirez, G. Nichols, B. Wursig and K. Miller. R.S. Payne (Ed.) Communication and behavior of whales. AAAS, Selected Symposia Series. Westview Press, Boulder, Colo.

## **The Abundance and Distribution of Humpback Whales in West Greenland Waters.**

Perkins, J.S., K.C. Balcomb III, G. Nichols, Jr. and M. DeAvilla., Canadian Journal of Fisheries and Aquatic Sciences. 1984. 41: 533-536.







# OCEAN RESEARCH AND EDUCATION SOCIETY

## CRUISE REPORTS r/v REGINA MARIS

Title	Date
Western North Atlantic Humpback Whales	July 1976-May 1977
Whales and Seabirds in Newfoundland Waters and in the Gulf of Maine	June-August 1977
Preliminary Report on the Populations of Humpback Whales on Silver, Navidad and Mouchoir Banks during the Winter 1977-78	December 1977-April 1978
The Galapagos Archipelago: Seabirds in Relation to the Cromwell Current and Observations on Terrestrial Fauna	August 1978
Porpoise Behavior in the Eastern Tropical Pacific Ocean	August-October 1978
Marine Mammals in the Sea of Cortez During November and December of 1978	November-December 1978
Marine Mammal Survey Along the West Coast of Baja, California; Mexico	April-May 1979
Sightings of Marine Mammals in Eastern North Pacific Coastal Waters	June-July 1979
Krill Availability and the Distribution of Humpback Whales in Southeastern Alaska	August-September 1979
Sightings of Marine Mammals in the Eastern North Pacific Between Los Angeles and Panama	November-December 1979
Population Estimates of Humpback Whales on the Breeding Banks in the Western North Atlantic	January-February 1980
Hawksbill Turtles in the Dominican Republic	March-April 1980
Search for Caribbean Monk Seals in the Southeast Bahamas Islands	April 1980
Preliminary Analysis of Numbers, Distribution and Behavior of Humpback Whales on their Feeding Grounds off the Coast of Massachusetts	August-September 1980
Estimate of the Arrival Time, Distribution and Numbers of Whales that Breed on Caribbean Breeding Areas away from the Main Concentration at Silver Bank	November-December 1981
Census of Humpback Whales on Silver Bank; Search for Humpbacks Around Bermuda; Collection of Fluke Photos and Song Recordings; Survey of Southern Bahamas for Sights and Stranded Skeletons of Cetaceans; Study of Bahamas Hutia; Survey of Cat Island for a Fresh Water Turtle	March-April 1981
An Ecological Study of Whales, Seabirds and the Marine Environment off West Greenland and Eastern Canada	June-August 1981
Survey of Coral Reef Community at Hogsty Reef, Bahamas	October-December 1981
Humpback Whales in the Western North Atlantic and West Indies	January-April 1982
Right Whales on Georges Bank	May 1982
An Ecological Study of Whales, Seabirds and the Marine Environment of West Greenland	July-September 1982
Coral Reef Studies at Coral Bay, St. John, Virgin Islands	October-December 1982
The Stocks of Humpback Whales in the North Atlantic Ocean	March-May 1983
An Ecological Study of Whales, Birds and the Marine Environment off West Greenland and Eastern Canada	July-September 1983
Oceanographic Studies in the Northwest Atlantic	March-May 1983
Coral Reef Studies at Hogsty Reef Bahama Islands	March-April 1984
Cetaceans and Seabirds in the Gulf of Maine and Georges Bank	June-August 1984







# SAIL & STUDY

Aboard r/v *REGINA MARIS*



**The Ocean Research  
and Education Society, Inc.**  
19 Harbor Loop  
Gloucester, MA 01930  
(617) 283-1475

(Photo by R. Drake)



## THE SOCIETY

The Ocean Research and Education Society is a non-profit, educational membership society, born from a conviction that knowledge and appreciation of the oceans and the fragility of their ecosystems must be vastly expanded if their enormous resources are to be conserved for future generations.

The Society, founded in 1975, pursues a combined program of research and teaching in open ocean ecology, working toward the realization of three goals:

1. to expand current knowledge and understanding of the ocean and its inhabitants through a continuing research program which operates 38-40 weeks at sea each year.
2. to offer students of marine life a unique opportunity to study marine mammals and ocean ecology while participating in ocean-going field research.
3. to create a well-informed constituency concerned with the oceans and the problems surrounding their preservation.

Current studies conducted aboard our primary research vessel *r/v REGINA MARIS* center on Cetacea—whales and dolphins. Several populations have been harvested to near extinction by commercial whale fisheries and huge gaps exist in our knowledge of these mammals' biology. Increased understanding of their behavior and habitat needs is essential to ensure their protection and preservation.



(Photo by K. Balcomb)



## RESEARCH

Results from the ORES research voyages have greatly expanded our knowledge of the ocean world. For more than six years, ORES scientists and their student assistants have been engaged in research concerning the feeding, breeding, and acoustic behavior of several whale populations, concentrating on the humpback whale (*Megaptera novaeangliae*).

Research projects focus in four general areas. First, ORES conducts annual census surveys to determine abundance and composition of the humpback whale population. Second, we photographically identify individual animals in order to study seasonal migrations and other movements. Third, researchers attempt to define favored habitats of humpbacks by examining the correlation between the presence of whales and ecological features such as plankton, fish and physical and chemical characteristics of the water column. Last, we record the acoustic behavior, the "songs" and other sounds, of humpback whales and seek to understand the purpose of this unique form of communication.

Although our research concentrates on the humpback, other whales and marine animals are studied as time and resources permit. Students are an integral part of the team, assisting in the collection and preliminary analysis of data.





(Photo by K. Balcomb)

## EDUCATION

The ORES Sail and Study semester is an alternative educational program for college students interested in the marine world. A full semester of credit is available for students enrolled in these 12-week expeditions. Six weeks are spent ashore at our classroom and laboratory in Gloucester, Massachusetts. Course offerings include: Marine Mammal Biology and Lab, Introduction to Oceanography and Lab, Introduction to Nautical Science, and Integrating Marine Seminar (history of oceanography; current marine management questions).

After attending the preparatory courses, students sail for six weeks aboard the Society's oceanographic research vessel, *REGINA MARIS*, on one of her regular working voyages. While on board, students assist the scientists with ongoing research projects, work with *REGINA*'s professional crew in all aspects of the ship's operation, and complete two field study laboratory classes in marine mammal biology and oceanography.

Accreditation and transfer transcripts for all ORES courses are available currently through the University of Massachusetts in Amherst. Alternatively, students may arrange credit and supervision through their own institution.

Ocean Research and Education Society, Inc. admits students of any race, sex, color and national or ethnic origin.

## SHORTER EXPEDITIONS

Other expeditions are offered throughout the year. These voyages take place entirely on board the ship and range in length from ten days to six weeks.

The Society also provides organizations, schools, and citizen groups with a variety of workshops, lectures, and courses on cetaceans. The Society's staff has acted as consultants to various groups in designing whale curriculum and related whale activities.

## ADMISSIONS

Men and women 18 years or older are eligible to study, work and sail aboard *r/v REGINA MARIS* as student research assistants. Preference is given to applicants who apply early and have a strong educational or career interest in marine biology. However, in the past, student research assistants have represented widely varied backgrounds and majors and have ranged in age to 74. No prior sailing experience is required, as each student is instructed in those fundamentals needed to safely operate a square-rigged sailing ship at sea.

Application materials may be requested from: ORES Admissions, 19 Harbor Loop, Gloucester, MA 01930, (617) 283-1475. Limited financial aid is available to qualified students who are unable to meet the full costs of a Sail & Study expedition.



(Photo by G. Nichols)



## MEMBERSHIP

Interested individuals are invited to become involved in the Society's work through participation in the research expeditions, attending land-based programs and supporting the Society by becoming a member. Membership is open to all individuals, families, or corporations with an interest in the ocean and its inhabitants.

Members receive the Society's two publications. **SEARCHLIGHT**, a biweekly report drawn from the ship's log, keeps members informed of the scientific work being done on board *r/v REGINA MARIS*. **ORES NEWS** is a quarterly newsletter which gives members a calendar of upcoming whale-oriented events as well as featuring educational articles about cetacean research. Detailed results of each Sail & Study expedition are available at cost to members in a series of Ocean Research Reports, published shortly after the conclusion of each trip.

Members are always welcome on board *REGINA* whenever she is in port. In addition, the Society invites all of its members to the festivities surrounding *REGINA*'s return to her home port of Gloucester. These events include an annual party, a member day-sail in the Massachusetts Bay area, and land-based lectures.

## THE VESSEL

*r/v REGINA MARIS* is a 144-foot, three masted barkentine. Launched in 1908 as a three masted schooner, she was the 100th hull built by J. Ring Andersen in Svendborg, Denmark. For a number of years she carried general cargoes around the North Atlantic, and later sailed mostly north European waters delivering the phosphates brought to the Elbe from the Pacific by the great windjammers.

In 1930, a diesel engine replaced her sails. She continued carrying cargo around Europe until a fire nearly ended her life in 1962. Siegfried and John Aage Wilson of Arendal, Norway, bought the hull, rebuilt her as a barkentine, named her *REGINA MARIS*, and set off on voyages which included a circumnavigation and a voyage to Australia via Cape Horn.

ORES bought *REGINA MARIS* in Greece in 1976 and refitted her for oceanographic work in Gloucester, Massachusetts. Since July 1976, she has sailed in the North Atlantic from Greenland to Venezuela and in the eastern Pacific from the Galapagos Islands to southeast Alaska doing research on whales and other marine life. Her tall masts provide ideal platforms from which to spot animals and observe their behavior while her stability at sea makes her an ideal ship from which to handle nets and other oceanographic gear.



(Photo by K. Balcomb)





Dear fellow members:

It is a pleasure to greet all of you once again from the pages of O.R.E.S. News, which has been inactive for far too long. So much has happened in the year since you received the last issue that it is hard to know where to begin.

The most noticeable change about the Society is the move from Boston into our new quarters. We are now happily ensconced in our Gloucester facility—a 6,000 square foot building which contains a classroom and library, wet and dry laboratories, a darkroom, and, for the very first time, really adequate office space for the staff as well as a storage area and shop for the ship. The site is quiet and clean, with a wonderful view of Gloucester Harbor and a deep-water pier where *Regina* can lie within steps of our headquarters.

All of us have been more than pleasantly surprised at the fine reception we have received in Gloucester. People are universally helpful and supportive, whether they be bank presidents, shipwrights, shop-keepers, construction workers, or maintenance people. During summer months when the ship is here, we have a continuous stream of visitors from all over the country, who come to Gloucester to see New England's premier fishing port and end up standing on our pier talking about square-riggers and whales.

Aside from moving, the year has been a busy one. Our program changed dramatically with the addition of a six-week classroom session prior to the research segment on board *Regina Maris*. Much time and effort is devoted to teaching, to preparation for the classroom, and to Friday field trips, which take advantage of the excellent museums and institutions in the Boston area as well as the nearby beaches, marshes, and even the harbor right off our pier! It is tremendously rewarding to see how much better

prepared the students are for doing research at sea. As a result, our spring cruise from the Caribbean to Gloucester, our voyage to Greenland, and the cruise back to the Caribbean in the fall were real successes. The Greenland voyage—our third in a row—was particularly informative, since ice-free conditions and calm winds allowed us to cover much more of the coast than in previous summers (see Research News).

Everyone will notice big changes in our personnel. Dr. Peter Major and Judy Perkins have joined our scientific staff; Stuart Goldman, Terry Linehan, and Maryke Litchfield are new to the Admissions and Student Services Department; and Larry Neilson and Bonnie Hyde are new additions to our support staff. It is with great regret that we said goodbye to Candace Julyan, our Director of Education, and to Bill Barton and Brenda Gehly of Admissions and Student Services—all of whom left O.R.E.S. to return to graduate school (see pages 4 and 6).

*Regina Maris* also had some major changes this year. Before our departure for Greenland, her stern was completely rebuilt at the Rocky Neck shipyard. We also replaced the mizzen with a hollow steel mast, which conveniently houses wiring for the navigational equipment.

Before "signing off," let me extend to all of you a warm invitation to visit us here at our new headquarters. We love to show it off, winter or summer, so do drop in!

With best personal regards.

Sincerely,

George Nichols, M.D., President

## The Semester Program

O.R.E.S. began its new twelve-week semester programs last February after moving from Boston to Gloucester. Students now spend six weeks at our Gloucester facility, taking eight courses (see below), and then join *Regina Maris* for the second six-week segment to conduct individually designed research projects and to assist our scientists in collecting data. Our new shore program enables students to earn a full college semester's credit (fifteen credit-hours) through arrangement with the University of Massachusetts/Amherst.

By taking courses in the classroom, students are well-informed and prepared for shipboard research. We can provide them with far more thorough theoretical and practical knowledge than they obtained previously when coursework and research were combined on the ship.

Our course offerings are:

- Marine Mammal Biology: 2 credits
- Marine Biology Lab I: 2 credits
- Introduction to Oceanography: 2 credits
- Introduction to Oceanography Lab I: 2 credits
- The Sea and Human Affairs: 2 credits
- Introduction to Nautical Science: 1 credit
- Field Research Lab I and II (on *Regina Maris*): 2 credits each



# Research Update

## Humpback Whale Research: Silver Bank 1983

The two research cruises of *r/v Regina Maris* to Silver Bank during the winter of 1983 (7 January-17 March 1983) were designed to refine the existing population estimates for humpback whales on their breeding grounds and to determine what feeding stocks might be represented in the breeding population that migrates to Silver Bank and the Caribbean. Answers to these questions require large numbers of fluke photographs of individual humpback whales. Population figures are then calculated from "mark-release-recapture" (MRR) techniques, which produce an estimate for population size based on the number of individual whales re-identified in successive years. We obtained more than 135 useful fluke photographs for this purpose during the 1983 season. Our preliminary analysis indicates that 21 of these whales were matches with previously known humpback whales, and approximately 114 were new additions to the humpback whale fluke catalog. Approximately 80 additional fluke photographs are still undergoing analysis, and surely more matches will be found.

The results of the 1983 Silver Bank cruises and those from previous years provided large enough sample sizes to permit us to calculate meaningful (statistically reliable) estimates for the size of the population of humpback whales utilizing the breeding grounds.

Silver Bank and nearby banks off Puerto Rico and the Dominican Republic are the principal breeding habitats for all western North Atlantic humpback whales, and a majority of the total oceanic population is thought to congregate there each winter. O.R.E.S. scientists and students have been studying the dynamics of this breeding population on Silver Bank since 1977 and compiling a photographic catalog of individuals, as well as using various census methods to assess more accurately their population size.

The MRR data, collected by O.R.E.S. and other collaborating scientists, was presented to the Scientific Committee of the International Whaling Commission (I.W.C.) in July 1983 as a working paper on the current status of North Atlantic humpback whale photo-identification studies and their importance in estimating population sizes. As a result of the I.W.C. meeting, the most recent "best estimate" for the entire North Atlantic population of humpback whales is  $5,773 \pm 1,032$  (95% confidence interval). This estimate

derives from photographic samples of humpbacks in all parts of their known Atlantic breeding (Caribbean and Bermuda) and feeding ranges (Gulf of Maine, Gulf of St. Lawrence, Newfoundland Labrador, West Greenland, and Iceland), shown on the map below. This estimate is significantly higher than previous estimates based upon census methods, but it is thought to be more realistic. After 7 years of hard work, we are encouraged by our progress and by the contribution we have made to the understanding of humpback whales.

— Ken Balcomb

## Expedition 45:

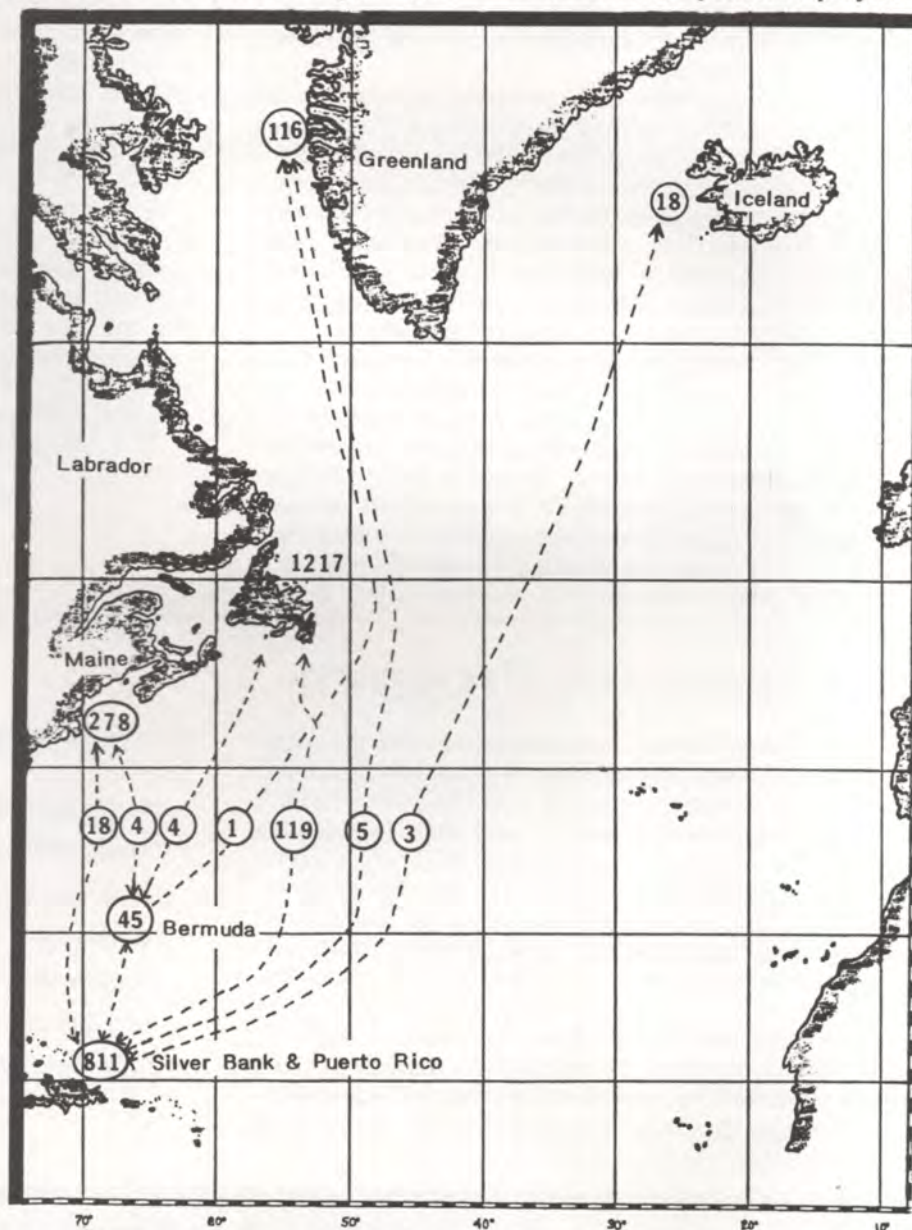
21 March - 2 May 1983

Expedition 45 ran between Puerto Plata, Dominican Republic, and Gloucester. Research objectives

involved a comparison of tropical and temperate inshore and offshore marine environments. Additional special projects were undertaken to contribute to on-going O.R.E.S. research on the endemic Cat Island turtle and on whale distribution off Cape Cod, Mass.

We began with a brief look at Silver Bank to assess humpback whale densities at the end of their breeding season. We also examined the seaward reef to evaluate this site for future coral ecology projects. We then traveled to Hogsty Reef in the Bahamas to repeat and expand our survey of marine organisms, begun there during Expedition 29 in 1982.

Students spent five days on Cat Island, capturing fresh water turtles in the fourth and final stage of the New York Zoological Society-World Wildlife Fund-sponsored project on



Migratory Matches: Number of Individual Humpback Whales Known to Migrate Between Particular Feeding and Breeding Areas



turtle ecology. After a brief stop in Nassau, we embarked on our passage to Gloucester, undertaking 2 deep-water oceanographic stations enroute, and keeping continuous records of cetacean and seabird sightings. Particularly useful results were gained from our surveys of conch densities at Hogsty Reef and the distribution of right whales in the Great South Channel, on the continental shelf edge east of Cape Cod. Several right whales photographed there have been identified subsequently in the Bay of Fundy by New England Aquarium researcher Scott Kraus.

— Perran Ross

#### Five-College Cruise: Spring 1983

On Thursday, 5 May 1983, professors and students from the Five Colleges in the Connecticut Valley of

Western Massachusetts boarded *Regina* in Newport, R.I., for a three-day research and education cruise. Early on the morning of 6 May, *Regina* left Newport heading almost due south along a trackline running to Block Canyon, off Block Island at the continental shelf break. Sediment and benthic fauna samples were collected at pre-selected stations. The location of these stations was designed to determine whether sediment size and composition could be related to distance from shore. Sediments and biological specimens were also collected from the sides of Block Canyon. During the homeward passage, we were kept busy analyzing the samples and teaching participants to sail the ship.

— Peter F. Major

#### Right Whale Research

On 12 May 1983, *Regina Maris* departed Newport, R.I. for a six-day research cruise in the Great South Channel region between Cape Cod and George's Bank. Peter Major and Perran Ross, along with visiting scientists from the New England Aquarium, U.R.I. School of Oceanography, and the Provincetown Center for Coastal Studies set forth to investigate the distribution of right, finback and humpback whales and Atlantic white-sided dolphins in relation to oceanographic variables. An additional goal was to obtain photographs of individual right whales, which can be identified by callosity patterns on their heads.

Fog and waves made photographic work difficult. However, several useful identifying photographs of right whales were obtained. The weather also made oceanographic work difficult, but our results indicate that different water masses (as characterized by water temperature and salinity) converge in the area and mix vertically and horizontally within hours and/or days. Although the data collected are preliminary, whales may remain in one water mass for 2-3 days before moving to another location. Future work planned in this field will help us to determine which oceanographic features and predator-prey relationships influence the distribution of right whales.

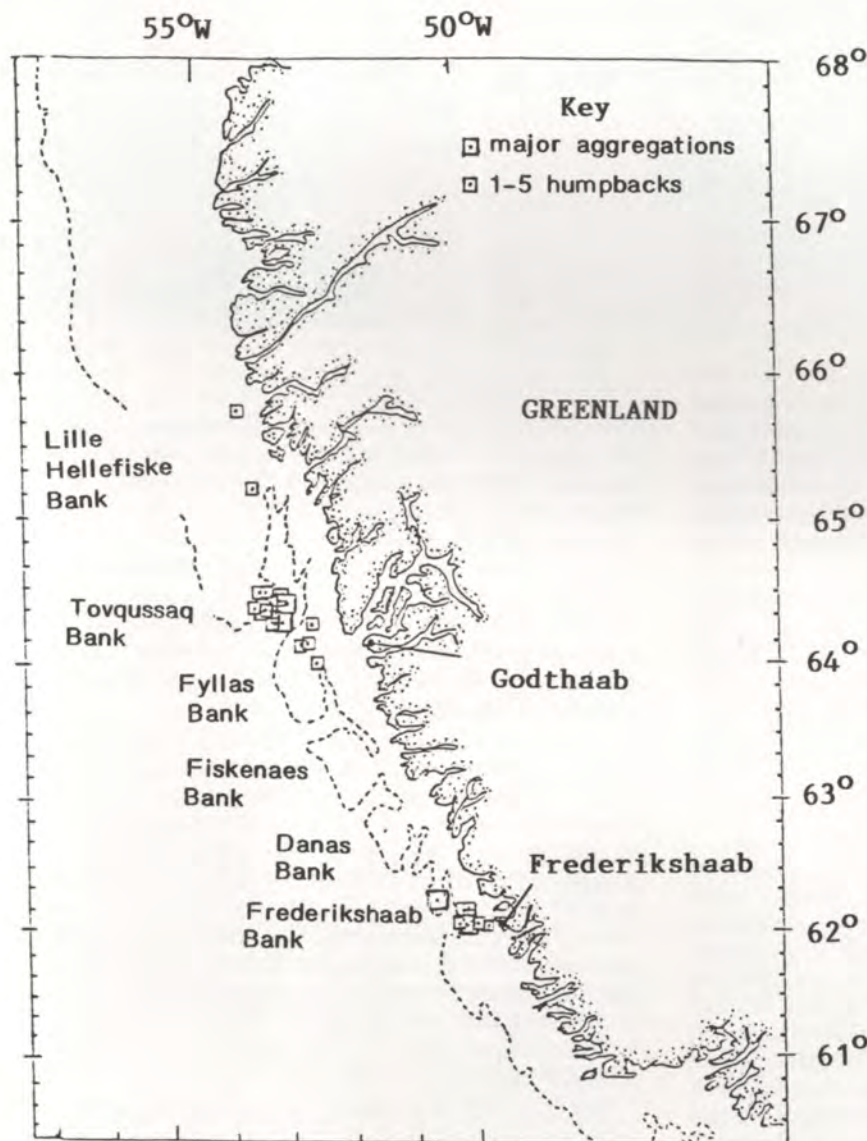
A gale forced *Regina* to seek shelter in Provincetown, Mass. for a day. The next two days were spent traversing Stellwagen Bank, north of Cape Cod, and collecting zooplankton samples along specific survey tracklines. We found visible differences between the samples. For example, fish eggs were more common in some than in others. We will gain more insight when quantitative analyses are completed.

— Peter F. Major

#### West Greenland Studies, Summer 1983

Between 7 July and 14 September 1983, we returned to West Greenland on *r/v Regina Maris* to try to establish whether humpback whales summering off this coast constitute a discrete feeding aggregation, and to assess their summer range and status more precisely than in previous summers. Our third research cruise to Greenland was the most successful of all, chiefly due to the benign weather conditions and relatively ice-free coastline between 61° - 70° N, which allowed us to work in a larger study area than before.

In all three years (1981-1983), we  
(Please turn to page 7)



Humpback Whale Sightings, West Greenland 1983



# O.R.E.S. Opens New Headquarters

Photos by Larry Neilson



Wet Lab



Ocean Research Pier

There's an air of excitement and purpose around the new O.R.E.S. headquarters. The staff has finished moving into our new building, and a new class of students has begun studying marine science. Together with several new staff members, the new facility signals a fresh phase in the growth of the Society.

Situated at 19 Harbor Loop in Gloucester, across from the historic Fitzhugh Lane House, the new building commands a magnificent view of Rocky Neck, Ten Pound Island, and Gloucester Harbor. The property includes a private wharf, and is convenient to the shipyard on Rocky Neck. We invite all of you to visit our new facility to see the work your membership supports.

## Special One-Week Courses

Ken Balcomb is launching a series of week-long mini-courses on the Biology of Killer Whales, which will be headquartered at Friday Harbor, San Juan Island, Washington. Eight lectures will be delivered by O.R.E.S. and visiting scientists on an array of subjects pertinent to killer whales: marine adaptations, social behavior, population dynamics, vocalizations, and research methods. Field trips will allow participants to gain first-hand experience in marine mammal research. Ken is making arrangements for regular credit through the University of Washington in Seattle and extension credit through the University of California at Santa Cruz. Session dates for 1984 are listed on page 8.

## Organizational News

In 1983, O.R.E.S. underwent some major changes in personnel. Last January, Larry Kilduff, our Assistant Director, departed for Newport, R.I., where he is working for an insurance firm. Candace Julyan, our Education Director, left us in July for a few months of relaxation before starting a Ph.D. program in education at Harvard University. Most recently, Bill Barton, Director of Students, decided to return to graduate school in business. Bill will be sailing transatlantic from Portugal to Antigua this winter before settling into academia next fall.

It was with great regret that we said goodbye to Larry, Candace, and Bill, for each has made a very meaningful contribution to the Society. Larry was *Regina's* relief skipper and tended many organizational aspects of the office on shore. Candace created solid university affiliation programs with O.R.E.S., established semester transfer credit for our students through the University of Massachusetts at Amherst, and taught an Integrating Marine Seminar at our shore school. Bill met our student enrollment goals and handled a variety of student and organizational needs. His voice, we're sure, is familiar to most of you.

We thank each of them sincerely and heartily for their help and hard work, and we wish them all the best of luck in their new endeavors.



**Expedition 42:** Sherry Braun is currently living in Syracuse and working in a community nutrition program. She has been sailing all summer and is now enjoying a great ski season. Karen Wagner has enrolled at U.R.I. as a natural resources major in wildlife biology and management. Rich Perkins is putting together a photographic essay on his windsurfing adventure in front of the foot of a glacier in Greenland last summer, which he hopes to have published in SAIL Magazine. At the moment he is a mate on *Regina Maris* on Silver Bank. John Goebel graduated from Carroll College in Helena, Montana in spring 1983, and is in his first year at Creighton University Medical School in Omaha, Nebraska. Jay Smith took a year off, first going on safari in Africa and then moving to California. He is now at Denison University in Ohio. Nicola Wadsworth spent some time living in Arlington, Mass. and working at Legal Seafoods, and is now on board *Regina* as crew member.

**Expedition 44:** Laren Scott spent last spring at New England College, worked for the Chesapeake Bay Foundation in Annapolis, Maryland for the summer, and is now crewing aboard *Regina* in the Caribbean.

**Expedition 45:** John LeBlanc worked as a waiter during the summer and then returned to Simon's Rock College as a junior in the fall. Kurt Brownsberger spent the spring doing carpentry work in Anchorage, Alaska before heading east to finish his degree at the University of Vermont. Ginny Guillod had her appendix removed a month after leaving *Regina*. After recovering, she returned to her job as an animal technician for a vet before moving to Columbus, Ohio.

**Expedition 48:** Luke Bloedel is on a ski patrol team in Washington. Eric Hutchins is back at UMass/Amherst and periodically comes to visit us when he's home for a weekend with his family. Lynn Lieberman was on *Regina* recently during a ten-day cruise sponsored by Suffolk University. Lynn has been teaching courses at North Carolina State University on endangered species and marine conservation. Billy Mahler flew to Germany just before Christmas to participate in the anti-proliferation rallies opposing the nuclear arms race. He plans to visit Nepal before returning to the States to start Wesleyan University next fall. Mari Smultea is in Geneva this year on an exchange program, and is busy with an internship with the International Union for the Conservation of Nature and Natural Resources. She



Rick Perkins (42)

finds time to visit Alexa Chiltern-Hunt, who is studying at business school in London. Diane Claridge is a crew member on board the cruise vessel *Fantome* sailing around the Bahamas. Mark Worrall, also at UMass/Amherst, was planning a visit to California to interview for a position with a consulting firm.

## Activities of O.R.E.S. Scientists

Ken Balcomb was an invited specialist to the 35th annual meeting of the Scientific Committee of the International Whaling Commission (I.W.C.), held in Cambridge, England from June 24 to July 8, 1983. Ken presented a paper on the status of the humpback whale population which winters in the Caribbean. In July, Ken traveled to Norway as a consultant to the I.W.C. and the Institute of Marine Fisheries, which is establishing a program of research on killer whales in coastal Norway. During December, Ken went on a lecture tour, giving talks at six universities in Washington, Oregon, and California.

Perran Ross attended the West Atlantic Turtle Symposium in San Jose, Costa Rica last July. He presented papers and sat on a discussion panel. During both the spring and fall Five-College research cruises, Perran participated as chief scientist. In August, he traveled to Australia to give a seminar on sea turtle ecology to the Commonwealth Scientific and Industrial Research Organization (CSIRO).

Peter Major presented a lecture at the Marine Education Association at Eastern Nazarene College, Quincy, Mass., in

November. On December 2, Pete was in Washington, D.C. to participate in the Sixth Meeting of the U.S. Ad Hoc Scientific Working Group in the Antarctic.

Judy Perkins gave lectures at Hampshire College in Amherst, Mass. and Smith College in Northampton, Mass. The topics were field methodology in marine research and the behavioral ecology of humpback whales.

Everyone attended the Fifth Biennial Conference on the Biology of Marine Mammals held in Boston between November 27 and December 1. Ken Balcomb gave a paper on the status and dynamics of a killer whale population which lives in Puget Sound, Washington. Pete Major chaired one of the sessions on humpback whale studies. Several of the O.R.E.S. scientists submitted research project abstracts, which appear in the published Volume of Abstracts produced for the conference. Ken and George Nichols summarized findings of a five-year study of humpback whales of Silver and Navidad Banks, West Indies. Judy, Ken, and George reported on their humpback whale research from data gathered off West Greenland over a three-year period.



# New Faces at O.R.E.S.



**Pete Major** joined O.R.E.S. last February to be the Society's first Director of Research. Between 1979-1983, Pete was the Assistant Scientific Program Director at the Marine Mammal Commission in Washington, D.C. After receiving his Ph.D. from the University of California at Santa Cruz in 1976 (dissertation: Predator-prey interactions of schooling fishes), Pete taught courses in biology, marine sciences, ichthyology and animal ecology at Simon Fraser University in Canada and at U.C. Santa Cruz. Pete's main research interests include predatory-prey relationships, interactions of marine fauna with oceanographic features, and development of research methodologies.



**Judy Perkins** joined O.R.E.S. as a Staff Scientist in October. Judy has been associated with the Society since 1976, when she first sailed on *Regina Maris* in Newfoundland to do whale research. Since then, she has been a scientist aboard *Regina* during the summers of 1977 and 1981-1983 on expeditions to Newfoundland, Labrador and West Greenland.

Last May, Judy received a Master of Environmental Science degree from the Yale School of Forestry and Environmental Studies. During her three years at Yale, she specialized in natural resource management of marine ecosystems, working with coral reefs in Belize, marshes and harbors in New England.

Judy received a B.A. in Biology from Boston University in 1974. From 1974-1979, she worked for Roger Payne on southern right whales, spend-



ing the last year in the field in Patagonia. Judy has worked on several whale research projects, has been a teacher, tour guide, and consultant in marine sciences.

**Stuart Goldman** is O.R.E.S.'s new Director of Admissions, and is busy helping us reach our student enrollment goals. Stuart came to us in November from Camden, N.J., where he was Director of Education for the Juvenile Resource Center, a non-profit organization involved with juvenile rehabilitation efforts. Stuart has had considerable experience working with inner city youths, having developed non-traditional educational and vocational opportunities for them. In addition, he has a strong background in marketing, recruitment (personnel and development), and public relations.



**Terry Linehan** is O.R.E.S.'s new Director of Student Services. A native of River Falls, Wisconsin, he graduated in 1981 from the University of Wisconsin at Lacrosse with a degree in Parks and Recreation Administration.

Terry brings a strong interest in marine education to the Society. He first sailed transatlantic in 1979, and then joined "Operation Drake," a two-year voyage commemorating the circumnavigation of Sir Francis Drake. In 1981 he worked as a sail training coordinator for the American Sail Training Association before joining *Regina* as a deckhand. He sailed with O.R.E.S. for five months between New England and the Caribbean.

Most recently, Terry led an expedition to Papua New Guinea, where he led young Tami Islanders in the building of a traditional 43' sailing outrigger canoe—the first such vessel built in the village in fifty years. Details of the canoe's construction and sailing qualities are put forth in



Terry's article "The Tami Canoe Voyage," published in the December issue of *Sea History*. The project was supported by contributions from four countries and gained recognition from Britain's Prince Charles, whom Terry met recently in London.

Terry's interests include music, literature, writing, and scuba diving. He brings with him broad experience in alternative educational experiences.

**Bonnie Hyde**, George Nichols' new secretary, came to O.R.E.S. in December. She spent four years in the advertising field, working with Humphrey, Browning, MacDougall and with Hill, Holiday, Connors and Cosmopoulos in New York. Bonnie has lived and worked in San Francisco, Alaska, Hawaii and Paris. Bonnie loves day lilies, writing and cooking. She is renovating



an old house in Gloucester, and she mentions grouting, sheet rocking and pruning as her major interests this year. We are glad to have her here in Gloucester with us.

If you call or visit the new O.R.E.S. office, chances are you'll be greeted by **Larry Neilson**, who mans the front desk. In addition, Larry is handling membership duties for the Society.

Originally from Northampton, Mass., he graduated from Vassar College in 1975. Since then he has worked for print shops and a photography studio, and spent two years in the production department of a weekly newspaper. He has been a freelance journalist and photographer and now contributes his talents in photography and graphic design to the Society's publications, including this one. His work for O.R.E.S. complements his lifelong interest in sailing and maritime history.



have found that the area around northern Fyllas Bank across Sukkertop Dyb (trench) to the southern edges of Tovqussaq Bank is the primary habitat for humpback whales and other cetacea during July and August (See Greenland map). In 1983, we found a second concentration of humpback whales east of Frederikshaab Bank, an area we had not surveyed before because of pack ice. The new fluke photographs we obtained from these whales produced a 1983 West Greenland stock estimate for the survey area of  $282 \pm 76$  (95% confidence interval), a marked increase from our estimate of  $180 \pm 43$  calculated from 1981 and 1982 data alone. We believe the 1983 figure to be an underestimate by about 10-15%, since some whales undoubtedly were missed (not seen) and others did not fluke-up, so they too were missed as no identifying photographs could be taken.

Comparisons of fluke photographs between the 2 main aggregations of humpback whales (Fyllas-Tovqussaq Banks and Frederikshaab Bank) showed there is some mixing of individuals, suggesting that West Greenland humpback whales comprise a single and unified feeding aggregation, rather than several

isolated aggregations. The West Greenland stock itself appears to be discrete since we still do not know of any humpbacks from other feeding aggregations being seen in West Greenland or *vice-versa*.

The issue of greatest significance to the Greenlanders and the I.W.C. is whether the subsistence harvest of 9 humpback whales (reduced from 10 at the 1983 I.W.C. meeting) can be sustained by the West Greenland aggregation itself. Assuming that only a few whales killed go unreported each year, it seems likely that the present quota will not deplete the whales. Results of a student project, plotting day-to-day and year-to-year movements of photo-identified individuals, suggested that humpback whales found in large groups tend to stay in them, but some larger foraging efforts occur for short periods of time. The locations of the 2 major groupings of this species are off Godthaab and Frederikshaab, major seaports, making them easily accessible and thus vulnerable to human activities.

We also measured various oceanographic and biological parameters associated with the Fyllas-Tovqussaq area to try to learn why it was repeatedly (daily and annually) used by whales. Data on water temperature profiles indicated the presence of a local "downwelling," which continuously produced large quantities of zooplankton, particularly copepods. This fertile area, presumably maintained by vigorous mixing within the water column, has sustained the greatest concentration of whales of all species during each of our 3 summers in West Greenland. It is gratifying to be able to point to some good reasons for directly linking different ecosystem components, and to discover that humpback whales, in particular, can serve as a useful indicator species for elucidating oceanographic processes and patterns.

— Judy Perkins

#### Expedition 49:

October - November 1983

The research focus of Expedition 49 was coral reef ecology at St. John, U.S.V.I. We maintained routine records of bird sightings, cetacean sightings, and water temperatures enroute and spent a week at Bermuda undertaking training and preliminary studies for our St. John work.

At St. John, we continued research in the Princess Cove area of Coral Bay, a site of O.R.E.S. research since 1982. Student projects included an analysis of bottom topography and water movement in the area, and

detailed studies of reef corals and reef fish. Student Scott Chrysler sampled distribution and diversity of hard corals after analyzing the effects of different sampling methods. Geoff Murphy and Mark Brotman found abundant evidence of aggressive interactions between corals, and they found some differences in the aggressive relationships between corals at St. John and those at Bermuda. Don Reavy demonstrated differences in photosynthetic pigments from symbiotic algae in corals between species and at different depths. A team of students continued to refine our studies of territorial damselfish begun in earlier expeditions. Some especially interesting results are that the complexity of a damselfish territory is more important than its area, and that damselfish attack green-colored models with greater vigor than models of other colors.

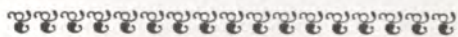
We undertook an extensive survey of the sea urchin *Diadema* and calculated average densities of 7680 per hectare. We erected enclosures of chicken wire and demonstrated the increased growth of algae when herbivorous *Diadema* were excluded. When we returned to Princess Cove eight weeks later, we found only three live *Diadema* and evidence of a massive mortality of urchins. Similar mortality has been reported recently elsewhere in the Caribbean, and we will continue to monitor the effects of this die-off of a major herbivore on the reef.

— Perran Ross



Maryke Litchfield comes to O.R.E.S. after spending the summer as cook and mate aboard m/v *Winner III*, a deep-sea fishing boat out of Rockport, Mass. Maryke began observing humpback whales from *Winner* when fishing was poor; "Whale-watching is more fun anyway," she laughs. Maryke is working as assistant to Terry Linehan and Stuart Goldman, answering inquiries and helping to recruit students for the Society.

Maryke has lived in Gloucester for the past twelve years. She is an active member of the Rhumbline women's softball team, which has been the league champion for the past six years. Maryke's interests include skiing, swimming, and adventure stories.



Photos by Ken Balcomb and Larry Neilson



# O.R.E.S. Calendar 1984

## Semester Programs

- **Class 84.1:** 27 December 1983-21 March 1984  
Behavioral Ecology of Humpback Whales  
(Silver Bank)
- **Class 84.2:** 12 February-9 May 1984  
Ecology of Coral Reefs, Marine Vertebrates, and  
Pelagic Habitats I  
(Caribbean-Gloucester)
- **Class 84.3:** 30 April-20 July 1984  
The Dynamics of Temperate Zone Feeding  
Communities I (Gulf of Maine)
- **Class 84.4:** 11 June-31 August 1984  
Dynamics of Temperate Zone Feeding Communities II  
(Gulf of Maine)
- **Class 84.5:** 10 September-5 December 1984  
Ecology of Coral Reefs, Marine Vertebrates, and  
Pelagic Habitats II  
(Gloucester-Caribbean)
- **Class 84.6:** 27 December 1984 -26 March 1985  
Humpback Whales: Habitat and Behavioral Ecology I  
(Silver Bank)

## Special One-Week Courses: The Biology of Killer Whales

- 3-9 June • 8-14 July • 5-11 August • 2-8 September

## Daysails

Look for dates in upcoming issues of *Searchlight*.

If you, your relatives, and friends would like more information about these programs, please call or write us. We have a new toll-free number for your convenience: 1-800-447-2022.



The Ocean Research  
and Education Society, Inc.

19 Harbor Loop  
Gloucester, MA 01930  
(617) 283-1475

NON-PROFIT ORG.

U. S. POSTAGE

**PAID**

GLOUCESTER, MA  
PERMIT NO. 16



# SEARCHLIGHT



R/V REGINA MARIS

— Ship to Shore News —

SEARCHLIGHT      Volume 9 No. 12      Dateline: South of Georges Bank      7/9/84

IN LOTS OF WAYS THIS HAS BEEN A TOUGH WEEK, but with lots of good times, too. The real problem has been weather -- lots of wind, ending with a real gale -- force 8 Beaufort yesterday. The wind made working with plankton nets and hansen bottles difficult and time consuming. Even more important, it made for big seas, lots of rolling and pitching, wet bunks, seasickness and so forth. The good parts included the fact that we have been able to collect lots of samples of water and plankton. We have managed to obtain extensive surface temperature and salinity data and we have seen wide flings in temperature and productivity which correlate well with the abundance of birds, plankton and such physical features as the Bank, the Gulf Stream, and the underwater canyons which cut into the continental shelf. The other good aspect of the wind has been that it made it possible to sail and sail and SAIL! From Tuesday afternoon until Sunday morning, the main engine ran for only two hours even though we covered nearly 400 miles and did seven major hydrographic stations, and innumerable short ones, while we explored down through the Great South Channel which separates Cape Cod and Nantucket shoals out across the continental shelf to the north edge of the Gulf Stream, then back northeastward to the outer end of Georges Bank and Corsair Canyon.

It was a glorious sail, plenty of wind -- sometimes more than some folks wanted. We did a steady five knots jogging along under easy sail until the science staff found themselves at a spot they wished to study in detail. There the call would go up, "Hands to the braces", and the yards would be hauled around to back the squaresails, whereupon REGINA would coast to a stop and mind her own business with wheel lashed steady and comfortable for whatever number of hours were needed to do our collections.

Some of these stations were quite complicated, taking two to four hours to complete. They often involved deploying a whole series of hansen bottles on the hydrographic wire to collect water samples down to depths of several hundred feet for salinity and other measurements. Then, down would go a series of self-opening and closing nets to sample the plankton at these various levels of temperature and salinity in the water column found at that particular spot in the ocean. Finally a surface sample of plankton would be collected as the other gear was stowed and the hands mustered to get underway again. Finally with nets back aboard, the science staff retired to inspect and analyze their samples as the old cry of "Let go and haul" rang out on deck. Once more, the yards swung back to their old position, the sails filled away and the helmsman spun the wheel to meet her as her head fell off and she gathered way.



There is a special feeling of doing these manouvers, a feeling which combines a sense of strength, history, teamwork, and skills well learned. There was no one aboard who did not share in the satisfaction, for everyone had played a part in bringing it to pass.

Unfortunately the 'good stuff' ended abruptly yesterday. The wind increased back to the southeast as the sea built up rapidly while we made our way off the Bank towards the east, motor sailing to windward. Eventually it became clear we were in for a blow when winds increased force 8 as a great rack of clouds raced across the sky from the west. Luckily the gale passed quickly, but even so, a few uncomfortable hours were put in by all, and seasickness returned to plague a few. As the cloud cover came, we turned to face the sea and wind in the hopes that it would soon pass. The gamble proved a good one as four hours later we were on a course to the south after the wind had swung rapidly into the northwest.

All this rough weather took its toll. Three sails were ripped, many bunks wet and tempers frayed. However things are looking up again. Winds are light, the sun is peeking out and the warm core eddy of the Gulf Stream we have been chasing is only 20 miles off.

Respectfully submitted,  
Capt. George Nichols  
ORV REGINA MARIS

Copyright Ocean Research & Education Society  
1984

\*\*\*\*\*

SEARCHLIGHT      Volume 9 No. 13      Dateline: Gloucester, Ma.      7/20/84

This is the last week of a 12 week session. After so much information collected during hours of lectures and study in class, the early weeks of field work aboard r/v REGINA MARIS was hampered by gales, fog, and the sometimes hard life of a sailor at sea.

Leaky bunks, midnight watches, a cup of the infamous strong coffee, feeling the rain run down your neck all during your trick at the helm and dumping the water out of your boots at the end of the watch, are all part of the real life experiences of a Marine Biologist in the field. This group of students have been thru a no-holds barred introduction to their prospective careers.

Let it be recorded that not one of our group was daunted by these hardships. All on board launched into this last week with a will. There was data to be compiled and project reports to be finalized and presented. The saloon and lab areas are covered with graphs, charts, data collection sheets and rough draft reports as students discuss their findings and conclusions. There is a lively air of earnest concentration as we spend the first day of this last week running a transect across the north end of "Stellwagen Bank". At last the weather is cooperative, with calm seas and sunny skies. Gloucester's "Moonie Fleet" along with a few other fishing boats is on station waiting for tuna as we sail past, collecting new data and observing humpbacks feeding. That evening we sail across Boston shipping lanes on our way to the southwest corner of the bank, just a dozen miles northwest of Provincetown on Cape Cod. Tuesday is a bright, glassy smooth day; we are treated to a view of some very active feeding behavior. The whales blow "bubble nets" to confuse their prey and then, swimming in twos and threes lunge thru schools of tiny 'sand lances'. They engulf tons of sea water and thousands of fish in a single gulp then lie on the surface to expell the sea water before swallowing the



fish. A few lucky sand lance can be seen wriggling thru the baleen to escape back into the sea, then the whale blows and dives for another gulp. Talking with the whale watch boats we learn that many of the whales are recognizable on sight and have been given names, such as 'Rosie' and her calf 'Tina'.

Wednesday was shrouded in fog and rain, though still calm, and the moan of the ships horn sounding the fog signal was as grey and dreary as the morning. Our chief scientist, Pete Major, declared the day not good for collecting data but good for working on student reports. By mid morning a delegation from the foc'sle came aft to request that the ship put into Provincetown. A visit to the main saloon showed the non-student portion of our complement looking dejected over games of solitaire and backgammon. A quick conference between Capt. and scientist decided some 'R' and 'R' might help a temporary slump in morale. So, we spent the afternoon and evening visiting shops, pubs, and having enjoyable reunions with former shipmates and scientists from the Provincetown Center for Coastal Studies.

Thursday was again calm and sunny but the schools of sandlance had departed along with most of the whales. However, we practiced running 'iron cross' shaped transect patterns over various areas of the bank and feeding grounds north of Cape Cod. This evening we set all sail to coast quietly back up to the north end of the Bank.

Friday we enjoyed a half day of whale watching before heading back to the 'barn' at Gloucester and the end of Expedition 84-3.

Respectfully submitted,  
Evan Logan  
ORV REGINA MARIS

Copyright Ocean Research & Education Society  
1984

\*\*\*\*\*

#### REGISTRATION FORM FOR ADULT EDUCATION COURSES

I have enclosed \_\_\_\_\_ to cover the full tuition cost of the following course(s):  
(check here) (members)

_____ Wild Flowers by the Edge of the Sea	\$54	\$45
_____ Sea Vegetables: Collection and Preparation	36	30
_____ Seaweed Supper	5	5
_____ Celestial Navigation	100	90
_____ Whales, Seals, and Other Furry Creatures...	85	75
_____ Shore Life in the Fall	60	50

Name \_\_\_\_\_ Tel # \_\_\_\_\_

Address \_\_\_\_\_

All classes are held at Ocean Research and Education Society, 19 Harbor Loop, Gloucester, Ma. 01930. Telephone (800) 447-2022 (in Mass. - 283-1475) if you have any questions.

Mail this form along with your check to: O.R.E.S. ADULT ED., to the above address. Payment must be received 2 weeks prior to the start of each class. There is a minimum enrollment of 6.

\*\*\*\*\*



## FALL ADULT EDUCATION PROGRAM

### Wild Flowers by the Edge of the Sea

Mr. Andrew DeLido

Saturday mornings, 9-12 noon

Sept 22, 29, Oct 6

\$54 (\$45 for members)

### Sea Vegetables: Collection and Preparation

Ms. Linda Parker

Monday mornings, 10-12 noon

Collection - Oct 22

Preparation - Oct 29, Nov 5

\$36 (\$30 for members)

### Seaweed Supper

Ms. Linda Parker

7 p.m., Nov 14

\$5

### Celestial Navigation

Mr. Terry Linehan

Tuesday evenings, 7-9 p.m.

Nov 6, 13, 20, 27, Dec 4

\$100 (\$90 for members)

### Whales, Seals, and Other Furry Creatures of the Deep

Mr. Kevin Chu

Monday evenings, 7-9 p.m.

Sept 24, Oct 1, 8, 15, 22

Whale Watch - Sept 29

\$85 (\$75 for members) - includes Whale Watch

### Shore Life in the Fall

Ms. M. Day

Wednesday afternoons, 3-5 p.m.

Oct 5, Nov 7, 14, 21, 28

\$60 (\$50 for members)

\* See page 3 for registration form. \*

## FALL PUBLIC LECTURE SERIES: Whales - Problems/Solutions

### \* TENTATIVE SCHEDULE \*

Sept 27 Humpback Whales - Mr. Kevin Chu

Oct 4 Strandings - Ms. Pat Fiorelli

Oct 11 Sperm Whales - Dr. Hal Whitehead

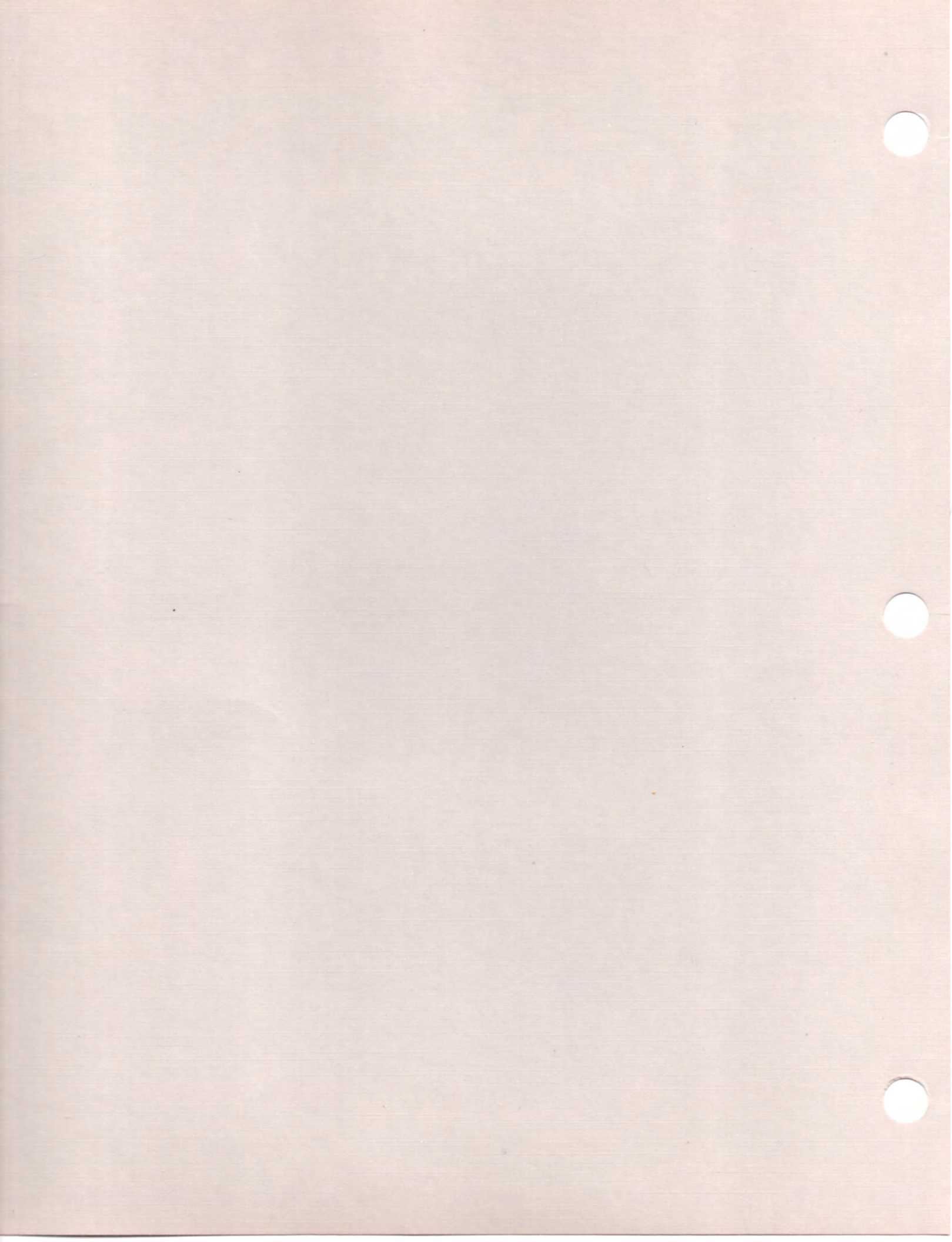
Oct 18 Right Whales - Dr. Howard Winn

Lectures begin at 7 pm at O.R.E.S. Refreshments served.



(Board of Directors)







## THE BOARD OF DIRECTORS

Dr. Geroge Nichols, Jr., President  
The Ocean Research and Education Society, Inc., Gloucester, MA



Mrs. Ann Nichols  
Clerk — Assistant Treasurer  
Manchester, MA

Mr. Caleb Loring, Jr. (trustee)  
Boston, MA

Mr. Adam Yarmolinsky (attorney)  
Kominers, Fort, Schlefer and Boyer, Washington, DC

Mr. William O. Anthonp, Treasurer  
Tucker, Anthony and R.L. Day, Boston, MA  
Mr. Stephen Clark (attorney)  
Legal Department, City Hall, Boston, MA

Mr. Edward F. Hayes, III (attorney)  
Abruzzo, Clancy and Hayes, Huntington, NY  
Mr. Douglas F. Mitchell  
Polaroid Corporation, Cambridge, MA

Mr. Romeyn Everdell, Senior Vice President  
Rath and Strong, Inc., Lexington, MA  
Mr. Paul G. Pennoyer, Jr. (attorney)  
Chadbourn, Parke, Whiteside and Wolff, New York, NY

Mr. Thomas Garrett  
(conservationist)  
Garrett, Wyoming

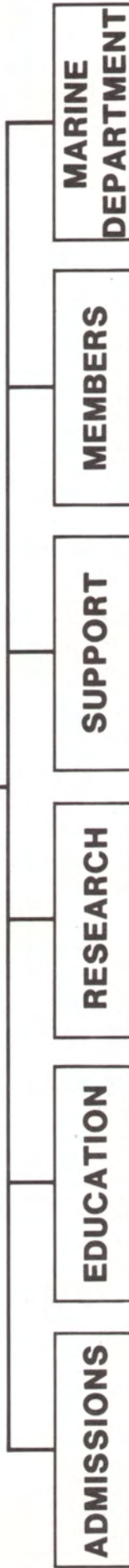
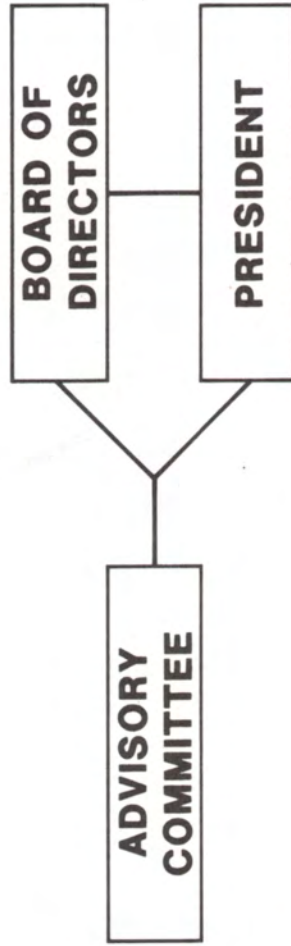
Mr. Lawrence Garrity  
(architectural designer)  
Quincy, MA











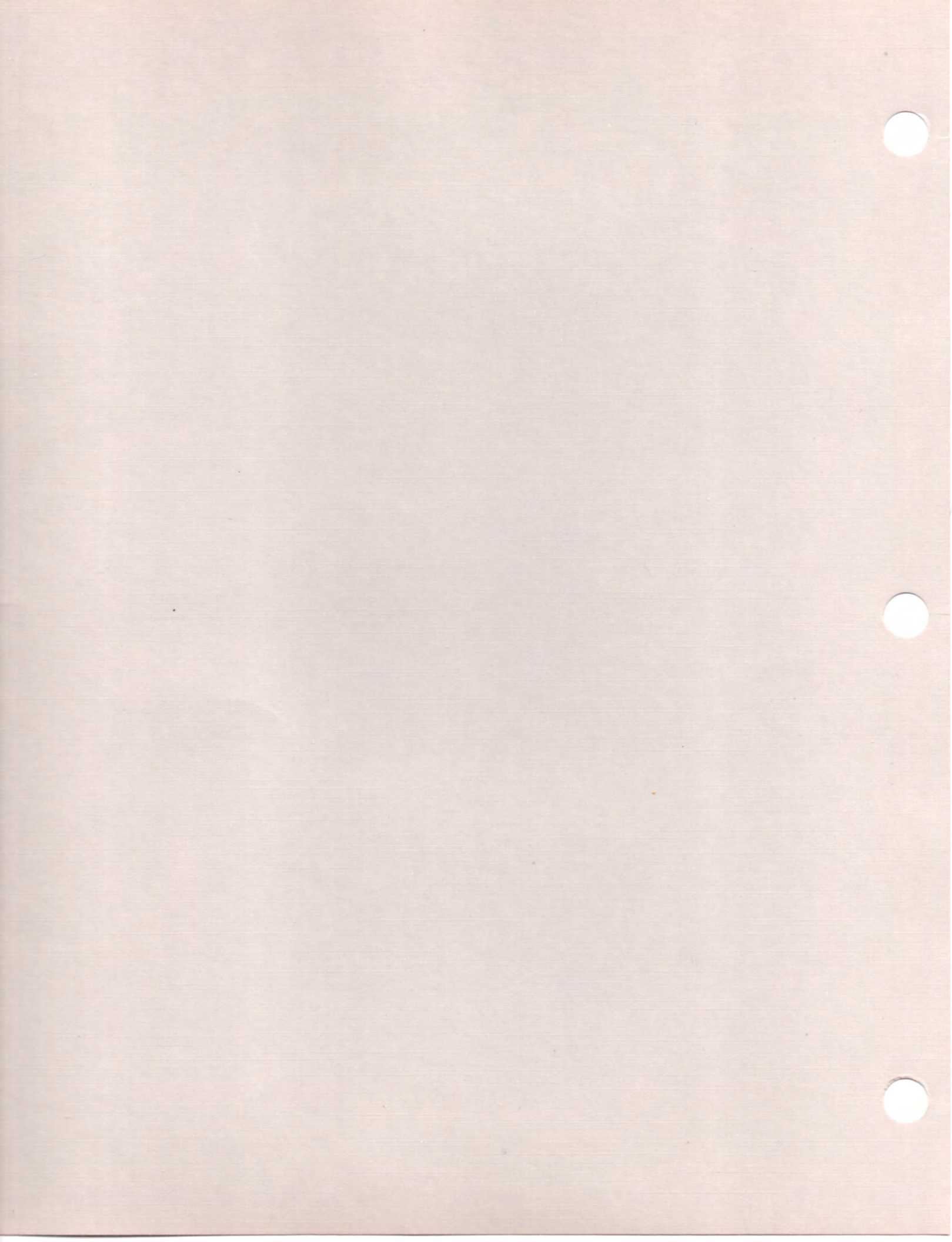






(The Advisory Committee)







## SCIENCE ADVISORY COMMITTEE

Alan Giddings  
Ocean Images, Inc.  
6853 Buckingham Blvd.  
Berkeley, CA 94705

John Prescott  
New England Aquarium  
Central Wharf  
Boston, MA 02110

Dr. Sylvia K. Earle  
Steinhart Aquarium  
Golden Gate Park  
San Francisco, CA 94102



Dr. George P. Fulton  
Special Assistant to the Executive Director  
South Carolina Commission on Higher Education  
Rutledge Building  
1429 Senate Street  
Columbia, SC 29201



Dr. Roger S. Payne  
World Wildlife Fund - U.S.  
1601 Connecticut Avenue  
Washington, DC 20009

Dr. Kenneth S. Norris  
University of California  
Center for Coastal Marine Studies  
Santa Cruz, CA 95064

William E. Schevill  
Woods Hole Oceanographic Institute  
Woods Hole, MA 02543



(Current Budget)











TOTALSFY83.....SEPT.....OCT.....NOVBUDGET BUDGETFY84 PROJ.FY84

## EXPENSES

SALARIES	204693	18719	19973	100	219204	203674
UNEMPLMT	4353	0	745	100	6340	9080
GP HLTH	5722	178	500	139	3696	7716
WRK COMP	262	34	34	91	300	546
RENT	25648	2283	2083	67	25000	25000
PHONE	17622	1131	1663	64	26400	23364
UTILITIES	3841	118	216	104	4000	6242
R/M OFF.	500	87	0	119	500	896
JANITOR	680	-3	298	81	4160	3924
OCCP INS	184	53	53	212	200	636
LIAB INS	1333	164	164	98	1333	1968
ADVERTIZ	14815	-28	2297	85	6000	7656
TRAVEL	10000	347	1559	85	13000	16520
PROM MEM	3617	0	2092	37	11250	6207
MEM CONSULT	13765	0	1530	21	14000	4334
LG&ACCT	12473	50	2115	70	10000	10533
PRINTING	14987	1150	-950	130	18000	34992
F&S PROCESS	1495	92	454	107	1500	2397
MAIL LST	1538	0	298	66	1700	1692
POSTAGE	7664	594	846	86	8700	11244
ED. SUPP.	1929	102	47	167	2000	5022
DUES&SUB	1907	18	0	52	2000	1568
OFF SUPP.	5118	225	504	92	6000	8307
SM EQUIP	4474	0	530	290	3000	10000
OFF EQ RNT	3176	230	289	62	3300	3053
OFF EQ R/M	1192	87	0	140	1200	2526
GDS RESALE	5139	0	0	14	6000	1296
TEMP HLP	1709	0	333	72	1800	1932
FRT&DELV	783	0	0	57	3000	2549
STD ACREDIT	10798	2772	0	47	22500	15708
STD. EXPENS	3006	712	0	76	3000	3399
GAL SUPP	1476	0	358	35	1500	785
FOOD	34008	1605	4242	55	36000	29895
GAL R/M	133	0	0	67	500	500
ER R/M	12528	2939	1912	72	10000	10847
ER SUPP	6459	78	1411	58	6500	5676
ER FUEL	18007	1919	5749	58	19000	16565
NAV P. FEES	1495	193	375	128	1500	2000
NAV R/M	631	415	-45	962	1200	12000
NAV SUPP	1577	0	109	23	1200	408
DK R/M	2628	176	339	20	2600	788
DK SUPP	5794	1244	4357	119	6000	10677
PROF SERV.	11224	750	750	206	8000	18000
SCI SUPP	2800	0	132	13	3700	735
SCI R/M	617	0	25	34	600	308
SCI LIB.	681	127	158	100	500	752
MED SUPP	179	0	0	0	200	0
LAUNDRY	881	127	61	44	1000	666
SHIP INS	34785	2663	8626	93	33000	33000
SHIP SURVEY	1358	7522	779	101	8500	11000
SHIPYARD	50649	10000	23130	99	50000	74031
MISC.	10045	-148	149	55	10000	8304
INTEREST	5455	512	1650	61	22200	20330

TOTAL EXPEN	587833	59237	91940	ERROR	652783	691240
-------------	--------	-------	-------	-------	--------	--------

## INCOME

CONTRIB.	195717	12091	1078	369	14200	62000
CON KIND&SV	2900	0	0	70	1500	2100
MEMB NEW	15040	340	225	26	18750	7230
MEMB RENEW	10345	1425	1300	48	21000	14985
TUITION	233251	6597	4850	43	375500	307723
STU DISCNT	0	0	0	ERROR	-36550	0
BOOK INCOME	1106	354	-165	77	2000	2322
APP FEES	2893	75	225	103	1875	2888
CONSRT FEES	4000	0	2000	106	8000	8500
GRANT&CONTR	48790	4866	5465	67	40000	46628
SALES	4037	762	152	33	7000	3462
CHARTERS	1375	0	0	0	2000	2500
SCH. FUND	4050	0	0	0	4000	2500
RM FUND	62423	0	24600	73	60000	54015
INTEREST	1731	160	207	30	2500	1118
OTHER	2201	0	140	332	2000	13280

TOTAL INCOM	589859	26670	40077	ERROR	523775	531250
IN. - EXP.	2026	-32567	-51863	ERROR	-129008	-159991















Department of the Treasury

P. O. Box 9081  
JFK Post Office

District Director

Internal Revenue Service

Date:

In reply refer to:

December 31, 1975

EP:EO J. Murphy  
(617)223-4241



► Ocean Research and Education Society,  
Inc.  
51 Commercial Wharf 6  
Boston, Massachusetts 02110

— Gentlemen:

Based on information supplied, and assuming your operations will be as stated in your application for recognition of exemption, we have determined you are exempt from Federal income tax under section 501(c)(3) of the Internal Revenue Code.

We have further determined you are not a private foundation within the meaning of section 509(a) of the Code, because you are an organization described in section 509(a)(1) & 170(b)(1)(A)(ii).

You are not liable for social security (FICA) taxes unless you file a waiver of exemption certificate as provided in the Federal Insurance Contributions Act. You are not liable for the taxes imposed under the Federal Unemployment Tax Act (FUTA).

Since you are not a private foundation, you are not subject to the excise taxes under Chapter 42 of the Code. However, you are not automatically exempt from other Federal excise taxes. If you have any questions about excise, employment, or other Federal taxes, please let us know.

Donors may deduct contributions to you as provided in section 170 of the Code. Bequests, legacies, devises, transfers, or gifts to you or for your use are deductible for Federal estate and gift tax purposes if they meet the applicable provisions of sections 2055, 2106, and 2522 of the Code.

If your purposes, character, or method of operation is changed, please let us know so we can consider the effect of the change on your exempt status. Also, you should inform us of all changes in your name or address.







If your gross receipts each year are normally more than \$5,000, you are required to file Form 990, Return of Organization Exempt From Income Tax, by the 15th day of the fifth month after the end of your annual accounting period. The law imposes a penalty of \$10 a day, up to a maximum of \$5,000, for failure to file a return on time.

You are not required to file Federal income tax returns unless you are subject to the tax on unrelated business income under section 511 of the Code. If you are subject to this tax, you must file an income tax return on Form 990-T. In this letter we are not determining whether any of your present or proposed activities are unrelated trade or business as defined in section 513 of the Code.

You need an employer identification number even if you have no employees. If an employer identification number was not entered on your application, a number will be assigned to you and you will be advised of it. Please use that number on all returns you file and in all correspondence with the Internal Revenue Service.

Please keep this determination letter in your permanent records.

Sincerely yours,

*George Delegianis*

GEORGE DELEGIANIS  
Acting District Director

CC: Attorney







# Return of Organization Exempt from Income Tax

OMB No. 1545-0047

**1981**

Under section 501(c) (except black lung benefit trust or private foundation),  
of the Internal Revenue Code or section 4947(a)(1) trust

For the calendar year 1981, or fiscal year beginning 9-1 1981, and ending 8-31 1982

Use IRS label. Other- wise, please print or type.	Name of organization <u>OCEAN RESEARCH AND EDUCATION SOCIETY, INC.</u>	A Employer identification number (see instruction L) <u>0175240</u>
	Address (number and street) <u>19 HARBOR LOOP</u>	B State registration number (see instruction D) <u>31--64</u>
	City or town, State, and ZIP code <u>GLOUCESTER MASS 01930</u>	C If address changed, check here . . ▶

D Check applicable box—Exempt under section ▶ ☒ 501(c) ( 3 ) (insert number), OR ▶ ☐ section 4947(a)(1) trust

1981 tax forms archived  
separately







OCEAN RESEARCH AND EDUCATION SOCIETY, INC.

BOARD OF DIRECTORS

PRESIDENT

Dr. George Nichols, Jr.  
President  
Ocean Research & Education Society

TREASURER

Mr. Paul Pennoyer  
Chadbourn, Parke, Whiteside & Wolff

CLERK-ASSISTANT TREASURER

Mrs. Ann Nichols

Mr. Randolph Barton (Ranny)  
President  
Parker Brothers Games

Dr. Gerard Bertrand (Gerry)  
President  
Massachusetts Audubon Society

Mr. Stephen Clark (Steve)  
City of Boston  
Office of Property Equalization

Mr. Adam Yarmolinsky  
Kominers, Fort, Schlefer & Boyer

Mr. Tom Garrett

Mr. William O. Apthorp  
Tucker, Anthony & R.L. Day

Mr. Larry Garrity

Mr. Caleb Loring, Jr.

Mr. Douglas F. Mitchell  
Polaroid Corporation

COPY

The above directors receive no compensation for  
their services as directors



OCEAN RESEARCH AND EDUCATION SOCIETY, INC.  
BOARD OF DIRECTORS

Mr. Adam Yatskovsky  
Kominets, Fort, Schiller & Boyer  
1776 F Street, N.W.  
Suite 500  
Washington, DC 20004  
O: (202) 467-5880

Mr. Tom Gattett  
Gattett, NY 82088  
In Washington: (202) 445-2270  
(202) 445-0260

His Mother: (202) 745-2230

Mr. William O. Aschorn  
Tucker, Anthony & R.E. Day  
One Beacon Street  
Boston, MA 02108  
O: (617) 725-2880

Mr. Larry Gattett  
30 Presidential Drive  
Quincy, MA 02169  
O: (617) 491-8450 Ext. 270  
H: (617) 472-8649

Mr. Caleb Loring, Jr.  
101 Devonshire Street  
Boston, MA 02110  
O: (617) 523-6231  
H: (617) 756-0230

Mr. Douglas P. Mitchell  
Polaroid Corporation  
249 Technology Square  
Cambridge, MA 02139  
O: (617) 577-4014

PRESIDENT  
Mr. George Nichols, Jr.  
President  
Ocean Research & Education Society  
15 Harbor Loop  
Worcester, MA 01620  
O: (617) 283-1475  
H: (617) 250-1254

TREASURER  
Mr. Paul Penneyer  
Shadbourne, Parks, Whiteside & Wolff  
30 Rockefeller Plaza  
New York, NY 10020  
O: (212) 541-5800  
H: (212) 670-8249

DEPUTY ASSISTANT TREASURER  
Mrs. Ann Nichols  
Professor Emerita  
Worcester, MA 01624  
H: (617) 250-1254

Mr. Randolph Barton (Randy)  
President  
Fisher Brothers Games  
30 Dunham Road  
Beverly, MA 01915  
O: (617) 927-7600  
H: (617) 926-1860

Dr. Gerald Bertrand (Gerry)  
President  
Massachusetts Audubon Society  
Lincoln, MA 01773  
O: (617) 259-0800  
H: (617) 269-4160

Mr. Stephen Clark (Steve)  
City of Boston  
Office of Property Evaluation  
147 Milk Street  
Boston, MA 02109  
O: (617) 725-4232  
H: (617) 723-7150

The above directors receive no compensation for their services as directors



## Student Applications

1. Application arrives by mail usually includes
  - a. application for enrollment form
  - b. statement of interest
  - c. \$15. non-refundable application fee
  - d. sometimes includes a transcript record
2. Make a file folder with student's name and expedition number. Tape a "Status of application" form inside front cover.
3. Respond same day with "Standard Reply to Application" letter. State all materials (with names and addresses) that have not yet arrived. Be sure to mail to correct address by noting the box checked on the form.
4. Eventually, all materials will show up in the mail (application, statement of interest, character reference, academic reference, transcript). Read through application and make qualitative judgment, then pass the file on to the rest of the "Admissions Committee" of GN, Candace, Perran, etc.
5. If suitable candidate, send "Acceptance Letter". Include:
  - a. Standard Acceptance Letter, altered as necessary. Should include some personal comment about the expedition, their application, etc.
  - b. two copies of the "Tuition Payment Policy"
  - c. Q & A list (2 sides)
  - d. Gear list
  - e. reading list
  - f. credit letter
  - g. Ship History with Specs.
  - h. any information that has been prepared for that expedition or any changes that have been made that deviate from the printed expedition schedule.
6. Somewhere along the way, most students ask for financial aid. After they have mailed their application form, send them (those who request) a financial aid form with the standard financial aid letter, which includes IRS required statements.
7. Financial aid forms should give an idea of how much the student can afford. With the Financial Aid Committee (mostly GN), arrive at a reasonable offer, always less than they ask for. Send a personal letter describing the aid package, encouraging an immediate response to establish a dialogue with a potentially reluctant student. In some cases, it may be best to call the student and make the offer over the phone, establishing an immediate dialogue. This method sometimes works, but is highly informal.







8. If you don't hear from a student within 10 days after you mail the acceptance letter and/or financial aid letter, call him. Use whatever tactics necessary to get them on board: "You presented a very strong application and we would really like to have you aboard."; "There are a limited number of berths left available and you need to arrive at a decision very soon."; "Do you have any questions about the program or this expedition? Any reservations?"; etc.
9. At least 6 weeks before departure, send an expedition briefing package. Include a trip memorandum, detailing exactly how students should meet the ship, customs and passport requirements, etc. (see past master files). A complete briefing should include descriptions of the research planned for that trip, background on the research, travel itinerary to be returned, description of the ports-of-call, life aboard ship, the crew, special reading lists, syllabi of courses, C.V.'s of science staff, and any other pertinent information that will answer the student's (and his parents') questions. A Xerox map of the area is very welcomed.
10. Four weeks before departure, prepare a master list. This one is prepared mainly for the ship and includes name, current or permanent address, passport number, next of kin with address and phone number.
11. Keep track of who has paid how much, scholarships, loans, etc. in two or three places so you can check yourself (Wall chart, student files, and a separate tuition file which details income for the entire expedition).
12. Anyone receiving a loan should sign a "Loan Re-payment Agreement" and receive a loan repayment schedule.
13. If pressed for time, you can save quite a lot of time waiting for mail to arrive if you take a reference over the phone. Referees seem to almost prefer this method since they don't have to write anything. It also gives you a chance to check up on 1) questionable, 2) last-minute students (the two descriptions usually go with one another).

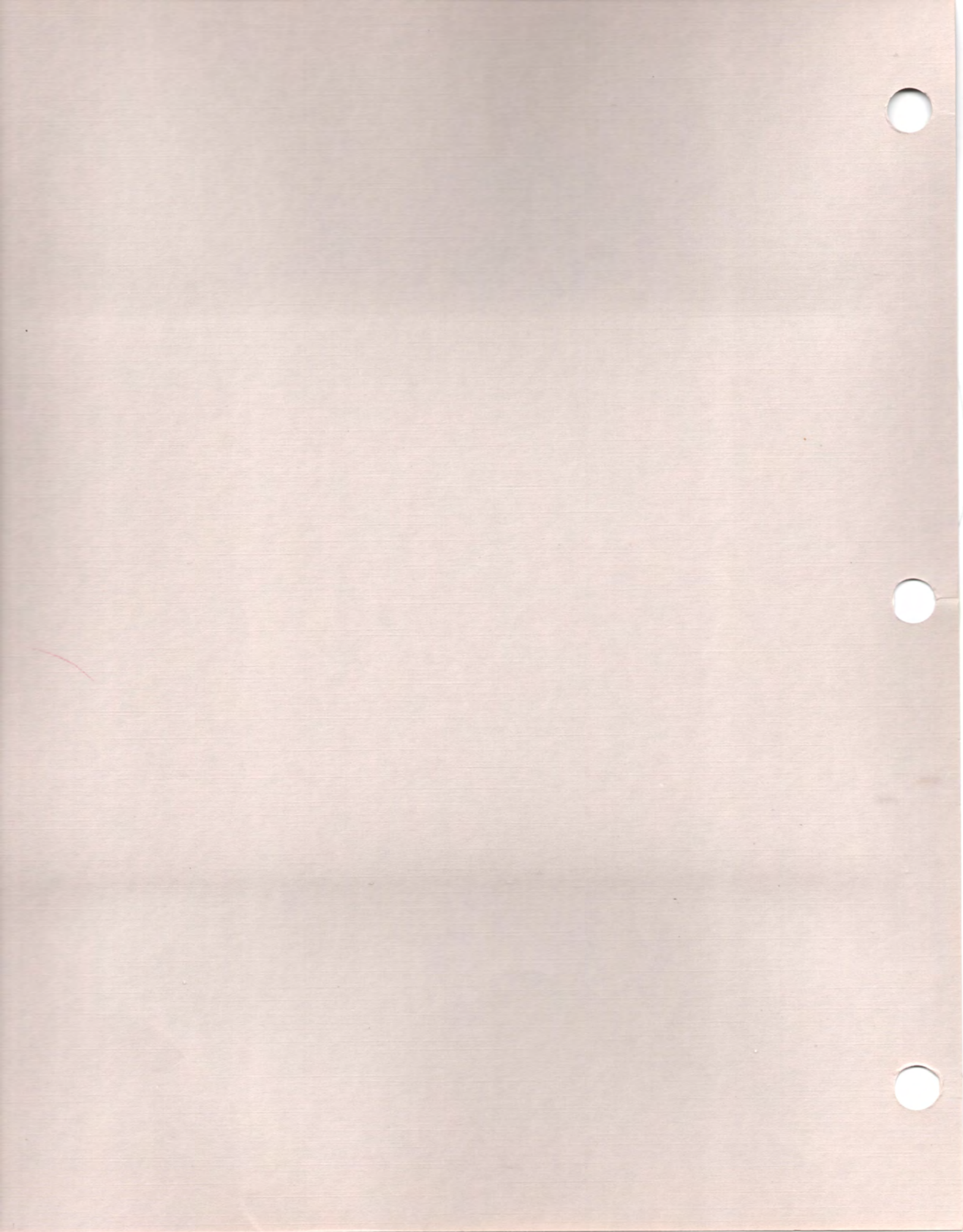


1. If you don't hear from a student within 10 days after you mail the application letter and/or financial aid letter, call him. Use whatever specific information to get them on board: "You presented a very strong application and we would really like to have you aboard." "There are a limited number of berths left available and you need to arrive at a decision very soon." "We have questions about the program or this expedition and your reactions." etc.
2. At least 6 weeks before departure, send an expedition planning packet. It should include a very comprehensive, detailing exactly how students should meet the expenses and present requirements, etc. (see past master list). A separate packet should include descriptions of the research planned for that time, background on the research, travel itinerary to be returned, description of the ports-of-call, life aboard ship, the crew, special teaching areas, etc. of courses, C.V.'s of science staff, and any other pertinent information. This will answer the student's (and his parents') questions. A letter up at that time is very welcome.
3. Four weeks before departure, prepare a master list. This one is prepared mainly for the ship and includes name, current or permanent address, phone, port number, next of kin with address and phone number.
4. Keep track of the fees and how much, scholarships, loans, etc. in one of three places so you can check yourself (Wall Chart, Student List, and a separate list of the fees which details income for the entire expedition).
5. Before receiving a loan check sign a "Loan Re-payment Agreement" and return a loan request schedule.
6. If possible for time, you can save quite a lot of time waiting for mail to arrive if you take a reference over the phone. Refused loans or other financial matters since they don't have to wait anything. It also gives you a chance to check up on it personally. (Last-minute students can get descriptions usually go with the packet).











# **ANNUAL REPORT 1983**

**The Ocean Research and Education Society, Inc.**

19 Harbor Loop Gloucester, Massachusetts 01930





### **Directors, 1983**

President, George Nichols, Jr., Ocean Research and Education Society  
Treasurer, Paul Pennoyer, Jr., Chadbourne, Parke, Whiteside & Wolff, New York, New York  
Clerk-Assistant Treasurer, Ann Nichols, Ocean Research and Education Society  
William O. Aphthorp, Tucker Anthony & R.L. Day, Boston, Massachusetts  
Randolph Barton, President, Parker Brothers Games, Beverly, Massachusetts\*  
Gerard Bertrand, President, Massachusetts Audubon Society, Lincoln, Massachusetts  
Stephen Clark, Legal Department, City Hall, Boston, Massachusetts  
William D. Davidson, M.D., Washington, D.C.\*  
Romeyn Everdell, Rath & Strong, Inc., Lexington, Massachusetts  
Thomas Garrett, Garrett, Wyoming  
Lawrence Garrity, Quincy, Massachusetts  
Edward F. Hayes, III, Abruzzo, Clancy & Hayes, Huntington, New York  
Caleb Loring, Jr., Boston, Massachusetts  
Douglas F. Mitchell, Polaroid Corporation, Cambridge, Massachusetts  
Lawrence Schmidt, Rumson, New Jersey\*  
Adam Yarmolinsky, Kominers, Fort, Schlefer & Boyer, Washington, D.C.

### **Science Advisory Board, 1983**

Dr. Sylvia K. Earle, Steinhart Aquarium, San Francisco, California  
Dr. George P. Fulton, Commission of Higher Education, Columbia, South Carolina  
Alan Giddings, Ocean Images, Inc., Berkeley, California  
Dr. Kenneth S. Norris, University of California, Santa Cruz, California  
Dr. Roger S. Payne, World Wildlife Fund—U.S., Washington, D.C.  
John H. Prescott, New England Aquarium, Boston, Massachusetts  
Dr. William E. Schevill, Woods Hole Oceanographic Institute, Woods Hole, Massachusetts

\*Resigned in 1983.

### **Academic Advisory Committee, 1983**

Dr. Allen Curran, Smith College, Northampton, Massachusetts  
Dr. Richard Fralich, Plymouth State College, Plymouth, New Hampshire  
Dr. Paul J. Godfrey, University of Massachusetts, Amherst, Massachusetts  
Candace Julyan, Ocean Research and Education Society  
Dr. Peter F. Major, Ocean Research and Education Society  
Dr. Eleanor Saboski, New England College, Henniker, New Hampshire  
Dr. Arthur J. West, II, Suffolk University, Boston, Massachusetts

### **Administrative Staff, 1983**

Kenneth C. Balcomb, III, Research Biologist  
William Barton, Director of Student Services\*  
Christine Curtiss, Administrative Coordinator  
Ruth Dare, Receptionist/Secretary\*  
Brenda Gehly, Assistant to Director of Student Services\*  
Stuart Goldman, Director of Admissions  
Bonnie Hyde, Secretary to the President  
Candace L. Julyan, Director of Education\*  
Jay Kaufman, Director of Education\*  
Lawrence Kilduff, Assistant Director\*  
Terry Linehan, Student Services Administrator  
Peter F. Major, Ph.D., Director of Research  
Larry Neilson, Receptionist/Secretary  
George Nichols, Jr., President  
Judith Perkins, Research Biologist  
J. Perran Ross, Ph.D., Research Biologist  
Marcia Scalli, Secretary to the President\*  
Joyce Verani, Administrative Assistant\*

### **Visiting Scientists, 1983**

Ms. Carol Carlson, Provincetown Center for Coastal Studies  
Mr. Philip Clapham, Provincetown Center for Coastal Studies  
Mr. Frederick Fairfield, University of Rhode Island  
Ms. Melinda Godfrey, University of Massachusetts  
Dr. Paul J. Godfrey, University of Massachusetts  
Dr. Thomas Hruby, Massachusetts Audubon Society  
Dr. Anthony Martin, Sea Mammals Unit, British Antarctic Survey  
Dr. Charles Mayo, Provincetown Center for Coastal Studies  
Ms. Carol Price, University of Rhode Island  
Mr. Gregory Stone, New England Aquarium



# Annual Report 1983

This has been an extremely active and exciting year for the Society—one that has seen many changes in personnel and in direction, many the direct result of the initiation of our new combined shore and sea-going teaching program. Indeed so much has gone on that this report can do no more than cover a few highlights. For more details on specific subjects, *ORES News*, *Searchlight* or our various cruise reports should be consulted.

## SCIENTIFIC WORK

**Research:** Once again REGINA MARIS spent the early months of the year working on Silver Bank north of the island of Hispaniola, our sixth year and fourth in a row working with the humpback whales that use this remarkable Bank as a breeding and calving area during the months of January, February and March. This year again the thrust was to photograph as many individuals as possible in order to enlarge our knowledge of migrations and to obtain through matching of fluke photographs with those taken in previous years an estimate of population using the so-called "tag-recapture" calculations refined by Peterson. As noted a year ago, this method of estimating population has a number of advantages over the census techniques previously used. The numbers appear more reliable even though we are unable to fulfill all the criteria which Peterson points out are required for precision. The biggest advantage is that this method brings us into close proximity to a large number of animals thus making it possible not only to re-identify individuals but to observe behavior in more detail. When the end of the season finally came and REGINA left the Bank for the last time, fluke photographs of more than 250 individual animals had been obtained. Once again the number of animals "matched" with previous years was in the order of 20%, yielding a population of known feeding areas by a significant margin. Why? Are there other feeding groups (perhaps off the European coast or in mid-ocean) whose individual members use the Bank for breeding and calving, too? We know animals from the Gulf of Maine, Newfoundland, Labrador, Greenland, and Denmark Strait (Iceland) go to Silver Bank, but are there representatives of other groups, too?

Once more we were privileged to have aboard with us for some of the work visiting scientists from other laboratories. Mr. David Mattila and Dr. Charles E. (Stormy) Mayo from the Provincetown Center for Coastal Studies, Dr. Tony Martin of the Marine Mammal Unit at Cambridge University in England and Miss Carol Carlson also from the Provincetown Laboratory were all with us at various times during the winter to aid Ken Balcomb in fluke photography and in the identification in the field of specific animals.

As in previous years we enjoyed little, if any, company on our numerous explorations of Silver Bank. Even fishing boats are rarely seen except on the southwest and southeast corners where spear fish and lobster men are occasionally to be found. It was, therefore, a considerable surprise to find the 5,000 gross ton freighter *Polyxeni* high and dry on the north end of the barrier reef. Just how *Polyxeni* got to its final resting place among the coral heads is a matter of considerable speculation as available information about her was very sparse even among officials in Puerto Plata. The one known fact is that she grounded sometime in August 1982 and was abandoned by her crew. In any case, the wreck provided many hours of recreational salvaging for the student body and crew as well as an excellent platform from which to snorkel in the virtually untouched coral gardens of the reef. Even more important, it forms a permanent easily recognized reference point of known position, allowing very precise navigation anywhere within a 9-mile radius as long as one has a functioning radar. This has allowed us to greatly improve our navigational charts of the northern part of Silver Bank thus enhancing the safety of operations and the skipper's peace of mind. The other big excitements of the winter were the two rescues of shipwrecked mariners; one group of five on Silver Bank, the other of two off Great Inagua. For details of both rescues see *Searchlight*.

On July 2 REGINA MARIS sailed once more to the West Greenland coast for her third and, for now, final summer of work with the humpbacks and other whales in that area. Not having any commitments to the Danish Government to look for Minke whales this year, the entire period could be devoted to studying the humpbacks along the coast. Support from the International Whaling Commission and World Wildlife Fund provided most welcome aid to this four-week study. Although the weather was somewhat colder than usual, winds were far lighter than in either previous years which meant less time wasted in port waiting for better conditions. It also meant that the east ice (the ice that breaks up on the east coast of Greenland, sweeps around the tip and is carried northward by the West Greenland current) was far less abundant and ended further south. As a result, for the first time we were able to examine the whale population as far south as Frederikshaab. Here, as suspected, we found another group of humpbacks which fluke photographs indicate are part of the same group that inhabits the banks off Godthaab. While the animals were more scattered this year, their major concentrations were located exactly as in previous years. At the season's end we had 64 more animals identified, bringing the total of known animals in the West Greenland feeding population to 118. Once again a significant number of animals were re-recognized from previous years, some from both '81 and '82, indicating the regularity with which animals revisit the same district. Final population estimates based on three years' work indicate an overall population on the order of 275 animals feeding off West Greenland.



A notable feature of the summer's work was the excellent quality of the individual student research projects. Thanks to their efforts, we found a good correlation between the abundance of zooplankton, sea birds and whales especially in the area of Sukkertoppen Dyb, a deep trough that separates the north end of Fyllas and Tovqussaq Banks north of Godthaab.

For the first time this year we had no visiting scientists on the voyage, the entire burden being carried by Ken Balcomb and Judy Perkins.

Someday radio tags will be sufficiently available for us to tag a few humpbacks and learn the details of their migratory routes between the breeding grounds and feeding grounds by following their tracks directly. Meanwhile REGINA has settled into a pattern of northward migration through the southeast Bahamas and southward via Bermuda to the coral reef in Hurricane Hole on St. John's in the U.S. Virgin Islands. While the main focus of the science of both these voyages is coral reef ecology, the area is wide enough to permit a variety of small research projects which focus not only on the coral itself but on the distribution of other animals and plants in the area. For the last four years this work has been supervised by Dr. Perran Ross. His studies of the relative abundance of spiny lobster and conch on Hogsty Reef are beginning to provide important information on the abundance of these two important food species on that remote and seldom visited reef. In the Virgin Islands the work has been more important as a teaching and training exercise than as a generator of original findings until this year when Dr. Ross noticed an unusual derth of the long spined black sea urchin *Diodema*. Thanks to counts done in previous years he was able to actually quantify the disappearance of these organisms, a phenomenon which seems to stretch all the way from Bermuda down to the greater and lesser Antilles and perhaps on to the Central American coast as well. Why the change has occurred no one knows, but the population appears to be reduced virtually to zero in a number of locations.

This report would be incomplete without the mention of Dr. Ross' ongoing work with the Cat Island Fresh Water Turtle. An educational handbook for the Cat Island people has now been prepared in collaboration with Candace Julyan. In addition, two field trips have been made to complete the census of these unusual beasts. Support for this work was provided by World Wildlife Fund—U.S. and the New York Zoological Society for this its final year.

**Meetings:** The Western North Atlantic Whale Research Association did not hold a regular meeting this year. Instead its members met with other whale and marine mammal research workers in late November for the Fifth Biennial Conference on research in marine mammals sponsored this year for the first time by the new American Society for Marine Mammalogy. For the first time also the meeting was held on the east coast in Boston under sponsorship of the New England Aquarium whose director, John Prescott, served as conference chairman. The undersigned was chairman of the entertainment committee; Peter Major served as chairman of one of the sessions; and Kenneth Balcomb of the Society's staff presented a paper. The Society rented a room in the conference hotel which served as a meeting place for interested participants. The displays of our teaching and research activities laid out there received much attention from our numerous visitors.

## EDUCATION

**Enrollment:** Although the rate at which inquiries arrived from interested students increased sharply during 1983, enrollment continued to be a problem. Indeed two classes in our shore program had to be abandoned for lack of interest. While both failed to mesh well with most college semester programs, it was clear that something else was amiss.

Careful examination suggested that the most reliable method of recruiting students is through the development of formal affiliations with a large group of colleges whose academic advisors will then recommend us to students wishing to vary their academic programs with some external study. The development of a sufficient number of such relationships to regularly fill out courses takes considerable time. Meanwhile something had to be done to persuade more of the large number of students who inquired about our programs to actually sign up in them. Past experience suggested that active marketing by telephone might be the answer. It was, therefore, decided to reorganize the Department of Student Services into an Admissions Department incorporating the special talents needed for such work.

Mr. Stuart Goldman came to us early in November from the field of juvenile justice with an extensive background in sales, promotion and telephone recruiting, first on a trial then on a permanent basis to head the Department. An extensive search for an Assistant Director to be responsible for student services resulted in the selection of Terry Linehan, a former student and deckhand, to take over for Bill Barton when he resigned at the end of the year. The challenge to Stuart when he came was to fill the class which began on December 27. Sixteen students sat down in our classroom as a result of his and Terry's effort. In addition, a host of students had been identified as interested in future classes, extending ahead for more than a year. Clearly telephone recruiting works!

**Shore School:** Our fondest hopes regarding the usefulness of shore teaching have been realized. In-depth instruction from lectures, laboratory, and field trips in general oceanography and marine mammal biology, plus the integrating seminar designed to make their studies "relevant" and the course in nautical science (mostly



navigation) and a brief introduction to shipboard life, delivers students aboard REGINA with a far clearer notion of what to expect not only scientifically but from the ship, its crew and from themselves. As a result, the two or three weeks once needed for students to become fully oriented to shipboard life has now been reduced in many cases to just a few days. Moreover, the scientists aboard now have students of known competence, each of whom is prepared to carry out some particular part of the research for the voyage. This means that necessary equipment has been collected and tested in advance, necessary reference material has been obtained and read, so that the student is "ready to go" by the time he first steps aboard. The improvement in the quality of the research done and in the cruise reports which can be written is really striking.

**Affiliates Program:** The university affiliates program has continued to grow in strength. Suffolk University conducted its third cruise with us in early January visiting once more the east end of St. John's in the U.S. Virgin Islands. An enthusiastic group of 17 students under the guidance of Dr. Peter Burn from Suffolk and Dr. Perran Ross from this Society collected corals, fish, invertebrates, etc. This cruise began in St. Croix, allowing for a much more gentle sea-going introduction to inexperienced stomachs than San Juan.

Five Colleges Inc.—the consortium of the University of Massachusetts with Smith, Mount Holyoke, Hampshire and Amherst Colleges—held its first field cruise with us, sailing from Newport, R.I. early on a May Friday and returning just after noon on Sunday. The ship carried an enthusiastic group of 25 students and instructors from their various sciences programs out to the edge of the continental shelf and back. Samples of water, bottom sediment, fish and plankton were collected at each of 13 stations, providing the group with enough material to examine for weeks ahead. Best of all, nearly perfect weather allowed the group to sample and enjoy REGINA under ideal conditions. The second cruise held in October was nearly equally successful despite less ideal weather. These two cruises have set the stage for a continuing and developing relationship not only with the Five College group as an institution but with a variety of faculty members as well. Dr. Paul Godfrey of the University of Massachusetts, Dr. Allen Curran and Dr. Brian White of Smith and, of course, Dr. E. Jefferson Murphy are to be particularly thanked along with Dr. Perran Ross of this Society for their development of these programs.

## REGINA MARIS

During the past year much has been done to continue upgrading the vessel. The entire stern section has now been reconstructed except for one deck beam which will be replaced in May, 1984. Several new sails have been purchased and much routine painting and other general maintenance work has been completed thanks to the devoted efforts of a considerable number of crew and volunteers. Much of this work has been paid for by the generous contributions of a large number of you to the REGINA MARIS FUND. Indeed the fund paid \$75,000 of the slightly over \$90,000 required to complete this work.

Careful review by your Board of the expenses involved in maintaining and updating REGINA MARIS during the eight years that we have owned the ship indicates that these costs have averaged something better than \$85,000 per year with a slow but steady trend upward. A comparison of these numbers with the expenses incurred by Sea Education to maintain their steel schooner, WESTWARD, indicates that were we to replace REGINA MARIS with a modern steel vessel, we could expect savings of \$30-\$50,000 per year through reduced maintenance costs and lower insurance premiums.

The Board felt that these figures were too important to ignore and have asked me to explore ways to replace REGINA. At the present writing no existing vessel suitable to our needs has been found. So attention is being given mostly to new construction with much active debate on type of vessel, etc.

## MEMBERS

Now that our recruiting efforts are more successful and cash flow is improved, direct mail promotion for increasing our membership will be resumed. While this effort must of necessity be modest at first we still dream of increasing our membership to several thousand rather than several hundred. Meanwhile, encourage your friends and acquaintances to join the Society. You can help us achieve our goals much more rapidly and efficiently than anyone else.

## FINANCES

Since its inception this Society was the beneficiary of the continuing extraordinary generosity of a single benefactor who, whenever we were in financial difficulty, stepped forward to give us the assistance we needed to go on. As modest and self-effacing as he was generous, this man insisted that his philanthropy be kept confidential during his lifetime. As many of you know Mr. Van Alan Clark, Jr. died in mid-July after a long and painful illness. That day this Society lost its best friend, for Mr. Clark had contributed much beyond dollars to our welfare. Wise advice and strong encouragement came in full measure with each generous financial contribution so that it is fair to say that he had as much to do with shaping our future as well as our past as any single person who has been involved with us.



The fall of 1983 was a difficult time as a result of his loss. Payables exceeded immediate prospects for student income, heavy expenses incurred in ship reconstruction were compounded by the loss of electronic equipment which occurred when REGINA was struck by lightning in early July. A proposal to a local foundation for funds to stabilize our administrative structure was turned down.

Thanks to the Admissions Department's hard work, cash flow from student tuitions has considerably improved, and I am happy to report several generous donations to general operating funds as well as for special purposes. As a result the financial position of the Society is once more secure and the prospects for the future are, if anything, better than they have ever been thanks to rapidly expanding enrollment. Indeed we have even begun to pay down our current bank loan and hope that we may be able to discharge it completely in the next 12 to 24 months.

This report would be incomplete without acknowledging the generous contributions of World Wildlife Fund—U.S., International Whaling Commission, Massachusetts Audubon Society, the Salem Marine Society and a private foundation which desires to remain anonymous, to the Society and its work. The help of these institutions as well as the many individuals who have given both to the general fund and to our special funds are most gratefully acknowledged.

For those of you who take note of such things, we not only changed accountants (I felt it would be very desirable to have a local firm with whom we could have easy access on a regular basis rather than one with offices an hour's drive away) but also our accounting system. The financial statements appearing in this report reflect these changes. It is a pleasure to report that thanks to the excellent cooperation of our new accounting firm, Horvitz & Frisch of Gloucester, and Chris Curtiss' hard work, our accounts are now computerized on our own Apple computer. This provides us with complete accounting data no more than two weeks after the start of each month.

In the attached financial statements expenses are shown in two schedules: 1) deals with REGINA MARIS alone; 2) deals with all expenses broken down by department.

## PERSONNEL

A major move from one city to another always means major change in personnel. We were singularly lucky in retaining the services of a number of key individuals who at considerable personal sacrifice moved with us from Boston to Gloucester in order to get us started here. Nevertheless it is with great regret that I have to record the departure of a large number of loyal staff including Miss Candace Julyan who resigned as Director of Education to pursue a doctorate degree in education at the Harvard School of Education. All of us here have missed Candace since she left us in July, not only for her cheery, happy presence but because of her enormous contributions to the design and building of our shore program. Candace's place was taken for a few months during the summer by Mr. Jay Kaufman who resigned in November. His place will be filled by Dr. Larry Lewis who will become our new Director of Education in May when he moves from his present position as Associate Professor of Biology at Millersville University.

Another important loss will be Dr. Perran Ross who has announced his resignation from our science staff after four years of devoted service to be effective in March. His place will be filled by Dr. Brenda Norcross who began working with the Society in late January.

It is a pleasure to welcome "aboard" Stuart Goldman, our new Director of Admissions, and his associate Terry Linehan. Their qualifications and responsibilities have been described above. Therefore, their names are included here only for completeness.

It was a sad day for this Society when Bill Barton told me late one afternoon that he felt it was time that he moved on to further challenges. Bill came to us to become Student Services Coordinator in January of 1982. Since then he worked extremely diligently and loyally not only to build up student enrollment but to make sure the students who did come to us had an enjoyable and productive experience. In addition he became the ship liaison officer, arranging transport for crew, purchasing material and doing all that host of difficult and generally uninspiring chores that make the life of a ship's crew happy rather than "impossible." Quite aside from his skills, Bill was a delightful co-worker, always cheerful, pleasant and willing to undertake whatever chore was needed. His plans for the future are to enroll in a business school where he hopes to study management of nonprofit institutions as his specialty. All of us here wish him the best in this endeavor. Who knows, someday he may return to us in a managerial capacity.

In addition I must record with regret the resignations of Miss Joyce Verani, Miss Ruth Dare, and Mrs. Marcie Scalli who performed important secretarial services for this Society during the past year.

It gives me great pleasure to welcome Miss Bonnie Hyde, Miss Maryke Litchfield and Mr. Larry Neilson to this staff to fill these vacancies.

As usual the crew aboard REGINA MARIS has continued to come and go as the arduous voyages follow one upon another. However, certain individuals deserve special mention. It gives me great pleasure to report that Mr. D. Evan Logan, the former master of the three-masted schooner *Sophia*, is now serving as relief master of the ship



with great skill. I also must report that Captain Kenneth Edwards of Sydney, Australia, completed with great distinction his nine months of service aboard the ship in early January prior to his return to his native Australia to embark once more on his duties as senior ship surveyor for the state of New South Wales. Subsequent to his return, Ken was named to the Knighthood by Queen Elizabeth of England for distinguished services. While there is a strong rumor going around the ship that he was knighted in recognition of his extraordinary devotion to REGINA MARIS and the Society, we are led to believe that other distinguished service to the Australian Government may have played an important role as well. In any case, all of us will have to be very careful to address him properly as Sir Kenneth in the future when we finally have an opportunity to congratulate him in person.

Finally, I want to report with pleasure that Miss Judith Perkins who has served aboard the ship for the last three summers as one of our staff scientists has agreed to accept a full-time position on the science staff now that she has obtained her M.A. in Environmental Sciences from Yale. It should be noted that Judy's association with us goes back to the summer of 1976 when she and Hal Whitehead joined the ship for two weeks of sailing and whale study along the northeast coast of Newfoundland. We welcome her help both with our research and our teaching.

Respectfully submitted,  
G. Nichols, Jr.  
President

Itinerary	ORV REGINA MARIS	January 1983-December 1983
27 Dec. 1982- 5 Jan. 1983	Suffolk University	San Juan, Puerto Rico - Virgin Islands - San Juan
7 Jan.-4 Feb.	VIP Cruise/44	San Juan - Silver Bank - Puerto Plata, Dominican Republic
7 Feb.-17 Mar.	Class 46	Puerto Plata - Silver Bank - Puerto Plata
23 Mar.-4 May	Class 45S	Puerto Plata to Newport, Rhode Island
5 May-8 May	Five Colleges	Newport to Newport
11 May-20 May	Class 47	Newport to Gloucester
6 July-1 Sept.	Class 48S	Gloucester - Greenland - St. John's, Newfoundland
3 Sept.-14 Sept.	Class 48C	St. John's to Gloucester
12 Oct.-23 Nov.	Class 49	Gloucester to San Juan



### Regina Maris Crew, 1983

Daniel Bareiss  
William Burke  
Ann DeBoir  
John Calogero  
Kevin Foss  
Pat Haub

Earl Henderson  
Mark Hoffman  
Austin Kennedy  
Stephen King  
Evan Logan  
William Lowrie

Douglas Nemeth  
Steven Newhouse  
Sam Payne  
Richard Perkins  
Lawrence Schuster

Laren Scott  
Kim Smith  
Alan Stearns  
Bonnie Walts  
David Whitney

### Students/participants, 1983

#### **Expedition 43**

Leonard Alberts  
Barbara Bradford  
Russell Branham  
Daniel Crewe  
Joseph Eckmann, III  
Paul Goldman  
John Halladay  
Alex Harrison  
Curt Hinckley  
Laura Kelley  
Ted Lane  
John Langdon  
Craig Maini  
John Morawski  
Andrew O'Brien  
Mark Puccio  
Larry Sides  
Kevin Spellman  
Rae Stone  
Mark Tieszen  
Donna Glee Williams

#### **Five College Cruise**

Linda Anne Chanler  
Paul Griffin  
Pilar Heredia  
Karen Kurkij  
Amanda Madeira  
Sharon Malsan  
Debi McCartney  
Kathleen McKibbin  
Robin A. Perlmutter  
Naomi Rose  
William A. Stevens  
Jeanne Hopkins Stover  
Christine Turner  
Nancy Whitney

#### **Expedition 44**

Mark Balsiger  
Martha Bennett  
Holly Bowron  
Michael Brooke  
Ted Cochran  
Robert Cutts  
Elizabeth Doherty  
Alan Gassel  
Margie Gassel  
Julie Gold  
Lori Jackintell  
D'Arcy Marsh  
Anthony Martin  
David Matilla  
Richard Mattson  
Charles Mayo  
George Moffett  
Ralph Nelson  
Joseph Oliver  
Judith Pratt  
Helen McLaren Scott  
Joann Tracy  
William Weatherbee

#### **Expedition 45**

Dawn Binder  
Kurt Brownsberger  
Ginny Guillod  
Estelle Harris  
Austin Kennedy  
Sharon Lee Kocis  
John LeBlanc  
Laura Martin  
Lisa Torrey  
William Keshishian

#### **Expedition 46**

Peter Bongo  
Holly Bowron  
Powel Brown  
Ann Cann  
Danny Childers  
Donna Dibbern  
Gerard Bormely  
Suzanne Halwick  
Lori Henderson  
David Meen  
Janet Reider  
Eliza Richards  
Willard Roosevelt  
Charles Sawyer  
Lawrence Sides  
Ben Thompkins  
Alisan Van Horn  
Steven Wash  
Sara Williams

#### **Expedition 47**

Phil Clapham  
Kathryn Ellis  
Fred Fairfield  
Thomas Ford, Jr.  
Lawrence Garrity  
Carol Price  
Gale Sinatra  
Semmy Stahlhammer  
Gregory Stone  
Howard Winn  
Cindy Zinner

#### **Expedition 48**

Luke Bloedel  
John Calogero  
Alexa Chiltern-Hunt  
Diane Claridge  
Douglas Haff  
Lili Hagen  
Kraig Hankins  
Lamont Harris  
David Hone  
Eric Hutchins  
Lynn Lieberman  
Billy Mahler  
John Maybank  
Pierre Manigault  
Mari Smultea  
Nina Thumser  
Mark Worrall

#### **Expedition 48C**

Douglas Mitchell  
Leonard Alberts  
Philip Cooper  
Paul Godfrey  
Hal Korstvedt  
Phyllis Malone  
Bob Malone  
Ken Los

#### **Expedition 49**

Chantal Beckmann  
Mark Brotman  
Cortland Budin  
Scott Chrysler, Jr.  
Kathryn Edelburg  
Carl Guariglia  
Steven C. Lamkin  
George Murphy, Jr.  
Rosemary O'Brien  
Donald Reavey  
Teresa Sitterle  
Susan Townsend



**THE OCEAN RESEARCH and EDUCATION SOCIETY, INC.**  
**Supplemental Schedule of REGINA MARIS Expenses**  
**Year Ended August 31, 1983**

	<u>Schedule 1</u>
Compensation	\$ 54,898
Fringe Benefits	3,722
Occupancy	650
Telephone	2,264
Travel	2,999
Supplies	19,645
Outside Services	1,288
Depreciation	54,941
Food	34,008
Fuel	18,078
Repairs and Maintenance	42,578
Navigation Fees	1,496
Ship Insurance	34,786
Miscellaneous	3,971
*Extraordinary Item - Repairs and Maintenance	52,049
	<u>\$327,373</u>

\*A detailed review of the Property and Equipment records during the current fiscal revealed that normal recurring repairs and maintenance charges for the vessel, REGINA MARIS, had been capitalized during prior years. Such charges were removed during the fiscal year ended August 31, 1983 and the undepreciated costs of \$52,049 were charged to current year's operations.



**THE OCEAN RESEARCH and EDUCATION SOCIETY, INC.**  
**Statements of Support, Revenue and Expenses**  
**and Changes in Fund Balances**  
**Year Ended August 31, 1983**

	Current Funds				Total All Funds
	Unrestricted	REGINA MARIS	Restricted	Scholar- ship	Grant
Support and Revenue:					
General Contributions	\$ 138,011	\$ 61,973	\$ 2,683		\$ -
Student Tuition and Fees	239,656	-	-		-
Grant Revenue	-	-	-		46,558
Membership Fees	25,385	-	-		-
Interest Income	94	1,615	21		-
Miscellaneous Income	7,613	-	-		-
Total Support and Revenue	410,759	63,588	2,704		46,558
Expenses - Schedules 1 and 2:					
REGINA MARIS	327,373	-	-		-
Operating Expenses	312,019	-	-		-
Grant	-	-	-		19,281
Total Expenses	639,392	-	-		19,281
Excess (Deficiency) of Support and Revenue Over Expenses	(228,633)	63,588	2,704		(135,064)
Other Changes in Fund Balances:					
Transfers from Restricted Funds:					
Repairs to REGINA MARIS	25,350	(25,350)	-		-
Tuition Payments	1,596	-	(1,596)		-
Grant Revenue	27,277	-	-		(27,277)
Fund Balance (Deficiency) Beginning of Year	(72,728)	43	38		(72,647)
Fund Balance (Deficiency) End of Year	<u>\$(247,138)</u>	<u>\$ 38,281</u>	<u>\$ 1,146</u>		<u>\$ (207,711)</u>



**THE OCEAN RESEARCH and EDUCATION SOCIETY, INC.**  
**Supplemental Schedule of Operating Expenses**  
**Year Ended August 31, 1983**

Schedule 2

	Education	Science	Member- ship	General and Adminis- trative	Total Expenses
Compensation	\$ 58,688	\$ 37,470	\$ -	\$ 31,249	\$ 127,407
Fringe Benefits	3,098	1,570	-	1,940	6,608
Occupancy	-	60	-	34,261	34,321
Telephone	790	-	-	14,568	15,358
Advertising and Promotion	16,173	593	18,752	1,519	37,037
Postage	3,461	-	1,876	2,309	7,646
Printing and Consumable Supplies	10,824	-	5,659	9,016	25,499
Student Creditation and Expenses	13,804	1,903	-	-	15,707
Outside Professional Services	-	346	-	13,373	13,719
Depreciation	483	-	-	2,892	3,375
Miscellaneous	1,373	158	1,375	9,693	12,599
Relocation Expense	-	-	-	7,288	7,288
Interest Expense	-	-	-	5,455	5,455
Total Expenses	<u>\$108,694</u>	<u>\$ 42,100</u>	<u>\$ 27,662</u>	<u>\$ 133,563</u>	<u>\$ 312,019</u>



## Balance Sheets

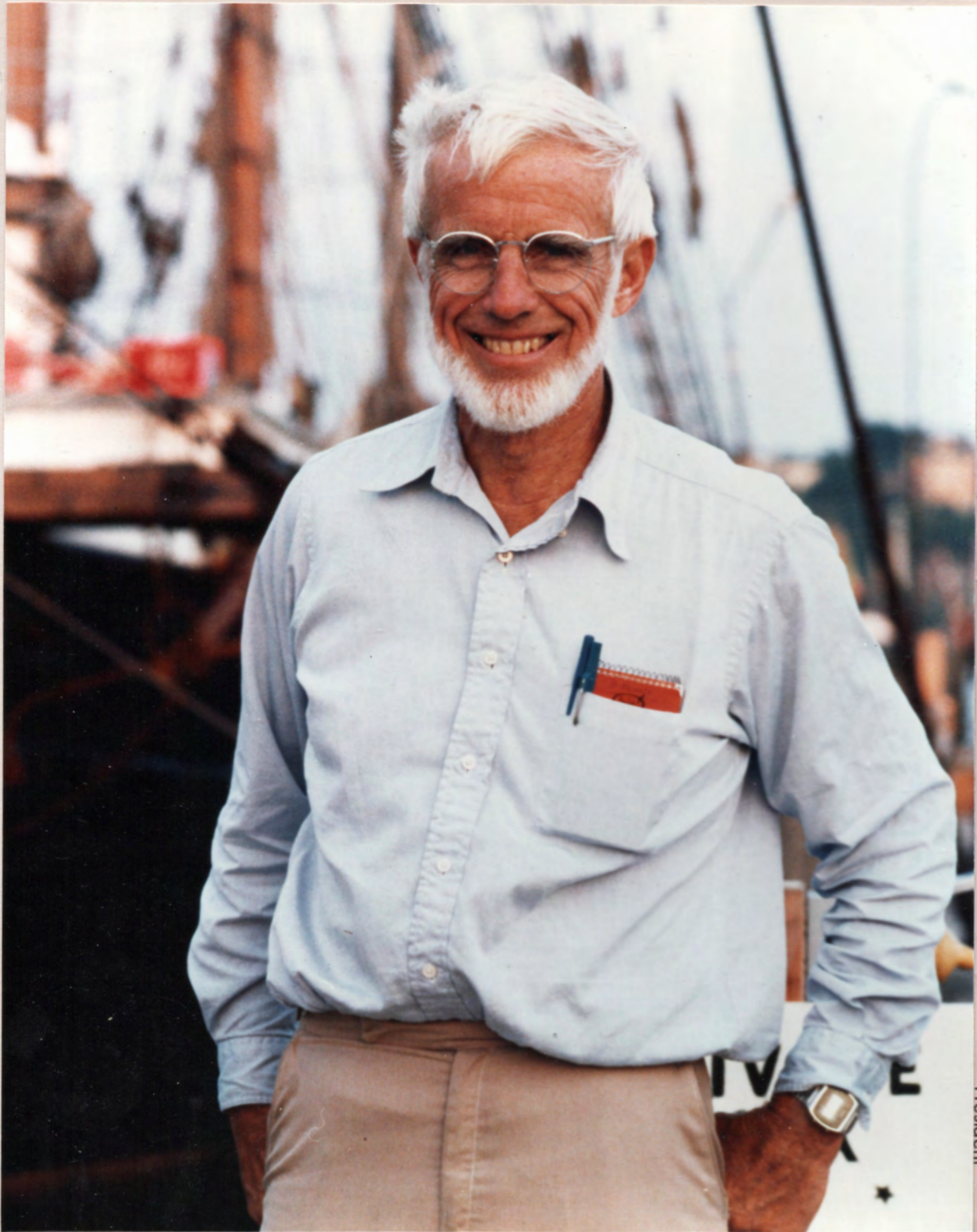
**August 31, 1983**

## LIABILITIES AND FUND BALANCES

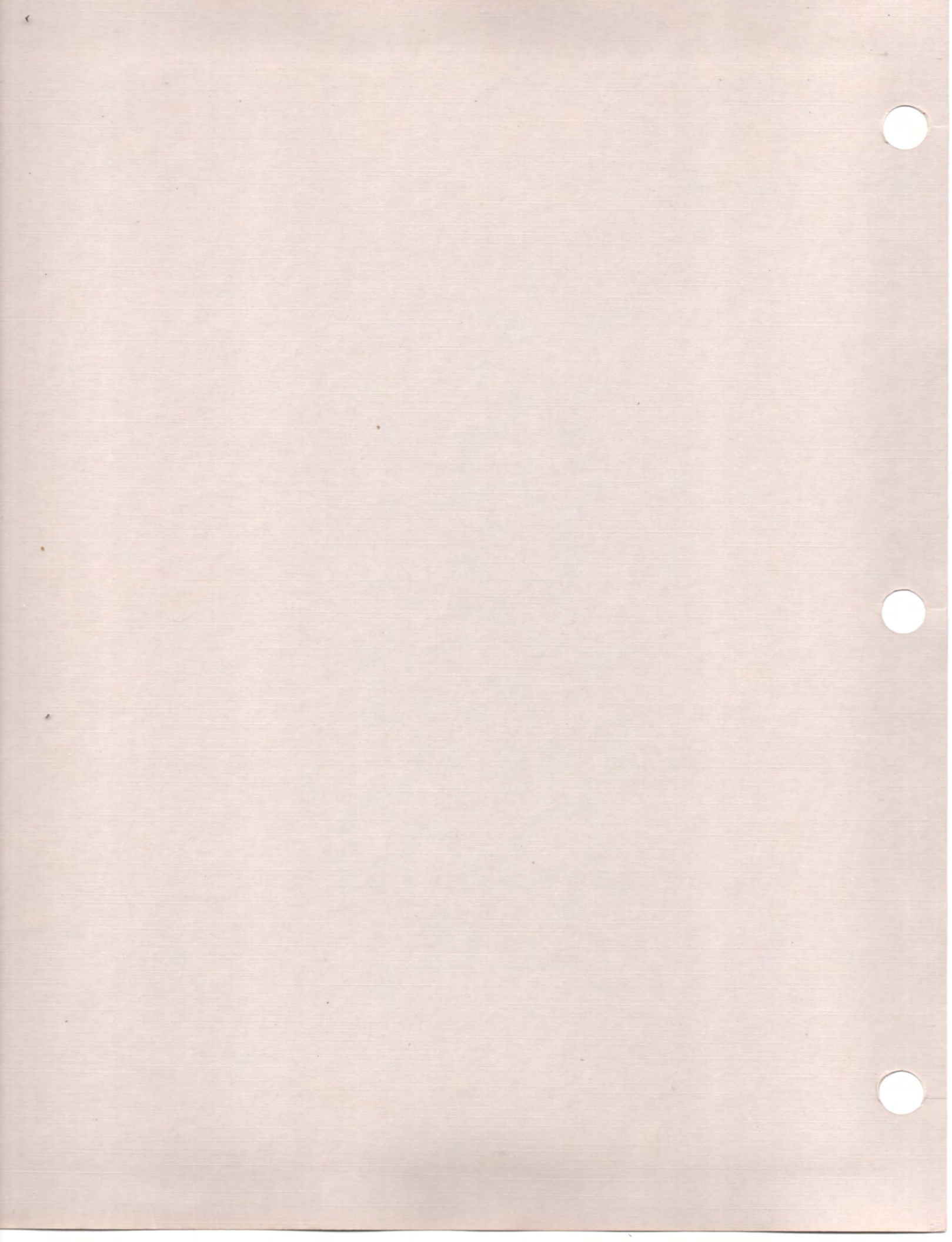
[illegible]



(George Nichols, Jr - President)









**GEORGE NICHOLS, JR.**

19 Harbor Loop Gloucester, MA 01930  
(617) 283-1475

**Master r/v REGINA MARIS**

President-Ocean Research and Education Society, Inc.

**Education:**

1939-1942 Harvard College  
1945 M.D., College of Physicians and Surgeons, Columbia University

**Past Employment and Appointments:**

Harvard Medical School

**Harvard Medical School**

1948-1950 Teaching Fellow in Medicine, Harvard Medical School, Boston  
1950-1952 Research Fellow in Pediatrics, Harvard Medical School  
1952-1953 Instructor, Department of Medicine, Harvard Medical School (On leave of absence)  
1953-1959 Associate in Medicine, Harvard Medical School  
1953-1955 Director of Health and Medical Care Program for Students in the Medical Area, Harvard Medical School  
1955-1956 Consultant to the University Health Services, Harvard Medical School  
1955-1969 Affiliated with the Department of Biological Chemistry, Harvard Medical School  
1959-1961 Secretary, Faculty of Medicine, Harvard University  
1959-1962 Assistant Dean for Curricular Affairs, Harvard Medical School  
1959-1965 Assistant Professor, Department of Medicine, Harvard Medical School  
1962-1965 Associate Dean for Academic Affairs, Harvard Medical School  
1963-1965 Associate Clinical Professor of Medicine, Harvard Medical School  
1965- Clinical Professor of Medicine, Harvard Medical School

**Hospital Appointments:**

1945-1946 Intern in Medicine, Presbyterian Hospital, New York  
1948-1950 Assistant Resident in Medicine, Peter Bent Brigham Hospital, Boston  
1953-1958 Associate in Medicine, Peter Bent Brigham Hospital  
1958-1978 Senior Associate in Medicine, Peter Bent Brigham Hospital  
1965-1968 Chief of Medicine, Cambridge City Hospital, Cambridge, Massachusetts  
1965-1968 Consultant, II and IV Medical Services (Harvard), Boston City Hospital, Boston  
1969- Visiting Physician, Boston City Hospital  
1978- Consultant in Medicine, Peter Bent Hospital

**Other**

1946-1947 Medical Officer, U.S. Navy  
1950 Research in Electrolyte Metabolism, Baker Clinical Research Laboratory, New England Deaconess Hospital, Boston. January-June  
1952-1953 Medical Officer, U.S. Navy, November 1952-August 1953. Stationed at U.S. Medical Research Laboratory, New London, Connecticut, Physiology Branch  
1955-1957 Investigator, Howard Hughes Medical Institute  
1957-1962 Markle Scholar in Medical Sciences  
1962- Advisory Editor, **Clinical Orthopaedics and Related Research**, On Editorial Board for Section on Basic Science Contribution  
1966-1968 Lecturer, Department of Nutrition and Food Sciences, Massachusetts Institute of Technology, Boston  
1963-1966 Special Consultant to the Public Health Service on the Medical Scientist Training Committee of the National Institutes of Health, General Medical Sciences.  
1967-1971 Special Consultant to U.S.P.H.S. Division of Research Grants; Member, General Medicine B Study Section  
1969-1975 Special Consultant, Argonne National Laboratory; Member of the Review Committee for the Radiological Physics Division







1969-1973 Director, Cancer Research Institute, New England Deaconess Hospital  
1970-1973 Member of the Committee on Space Medicine's ad hoc Review Panel on Calcium Dynamics and Endocrinology, National Academy of Sciences Space Science Board.  
1975- President, Ocean Research and Education Society

**Honors:** Alpha Omega Alpha  
Association of American Physicians  
American Society for Clinical Investigation  
Markle Scholar in Medical Sciences, 1957-1962

**Certifications:**

Board of Registration in Medicine, Commonwealth of Massachusetts  
American Board of Internal Medicine

**Certification:**

Board of Registration in Medicine, Commonwealth of Massachusetts  
American Board of Internal Medicine

**Memberships:**

American College of Physicians  
American Federation for Clinical Research  
American Physiological Society  
American Society for Clinical Investigation  
Association of American Physicians  
The Endocrine Society  
New York Academy of Sciences  
Sigma Xi  
Oceanic Society (Director)

**Administrative Committees:**

Admissions Committee: 1952, 1953-1965  
Student-Faculty Committee: 1953-1958 and 1972-1973  
Administrative Board (ex officio): 1953-1956; Secretary 1959-1965  
Committee on Examinations: 1953-1968  
Curriculum Committee (Secretary): 1956-1965  
Ad Hoc Committee on Curricular Arrangements for Preclinical Teaching and Integration with Clinical Teaching (Secretary): 1956-1957  
First Year Course Committee: 1957-1961  
Gay Lectureship Committee: 1957-1964  
Medical Education for National Defense Committee: 1956-1968  
Subcommittee of the Curriculum Committee for Third and Fourth Years (Secretary): 1958-1961  
Committee on Meetings in Medical and Dental School Buildings: 1959-1961; 1964-1965  
Prizes and Awards for Medical Students (Chairman): 1960-1961; 1961-1965  
University Committee on Programmed Instruction: 1961-1965  
Subcommittee on the Third and Fourth Year Curriculum (Chairman): 1961-1962  
Space Assignments in the Medical School: 1962-1965  
Promotion Board (ex officio): 1953-1965  
Ad Hoc Committee on Clinical Teaching (Secretary): 1962-1963  
Student Health Committee (ex officio): 1953-1965  
Clinical Section of the Curriculum Committee (Secretary): 1963-1965  
Committee of Professors: 1963-  
Ad Hoc Committee on Tutorial Programs (Chairman): 1964-1966  
Intra-University Committee on Television: 1965-1968  
Ad Hoc Committee on Federal Programs for Medical Care: 1965-1968  
Cambridge City Hospital Committee (Chairman): 1965-1968  
Committee on Resources, Harvard Medical School: 1970-1975  
Subcommittee on Electives and Tutorials, Harvard Medical School: 1970-







**Present Major Endeavor:** Oceanographic Research and Writing  
President, The Ocean Research and Education Society, Inc.

**Civic Activities:** Formerly Trustee and President of Dexter School, Brookline, MA  
Former Director of Oceanic Society  
Corporation Member of Woods Hole Oceanographic Institution  
Director, Ocean Voyages Institute, Sausalito, CA  
Director, American Sail Training Association  
Chairman, Council of Educational Ship Owners of American Sail Training Association.







## BIBLIOGRAPHY

### I. Original Papers:

1. Electrolyte Equilibria in Erythrocytes During Diabetic Acidosis. G. Nichols, Jr. and N. Nichols. Jour. Clin. Invest. **32**, 113-120, 1953.
2. The Direct Measurement of the Extracellular Phase of Tissues. G. Nichols, Jr., N. Nichols, W. Weil, and W. M. Wallace. Jour. Clin. Invest. **32**, 1299-1308, 1953.
3. The Role of Bone in Sodium Metabolism. G. Nichols, Jr. and N. Nichols. Metabolism **5**, 438-446, 1956.
4. Changes in Tissue Composition During Acute Sodium Depletion. G. Nichols, Jr. and N. Nichols. Am. Jour. Physiol. **186**, 383-392, 1956.
5. The Solubility of CO<sup>2</sup> in Body Fat. G. Nichols, Jr. Science **126**, 1244-1245, 1957.
6. Effect of Large Loads of Sodium on Bone and Soft Tissue Composition. N. Nichols and G. Nichols, Jr. Proc. Soc. Exp. Biol. and Med. **96**, 5-839, 1957.
7. Serial Changes in Tissue Carbon Dioxide Content During Acute Respiratory Acidosis. G. Nichols, Jr. Jour. Clin. Invest. **37**, 1111-1122, 1958.
8. The Effect of Allexan Diabetes and Acidosis on the Mineral and Water Content of Bone. N. Nichols and G. Nichols, Jr. Jour. Clin. Invest. **37**, 1676-1685, 1958.
9. Effects of Adrenalectomy and Aldosterone on Sodium Concentration in Renal Medulla of Hydropenic Rats. J. Crabbe and G. Nichols, Jr. Proc. Soc. Exp. Biol. and Med. **101**, 168-171, 1959.
10. Some Effects of Adrenalectomy and Prednisolone Administration on Extracellular Fluid and Bone Composition in the Rat. A. B. Borle, G. Nichols, Jr. and M. J. Karnovsky. Endocrinology **66**, 508-516, 1960.
11. Effect of Parathyroidectomy on Content and Availability of Skeletal Sodium in the Rat. G. Nichols, Jr. and N. Nichols. Am. Jour. Physiol. **198**, 749-753, 1960.
12. Metabolic Studies of Bone **in vitro**. I. Normal Bone. A. B. Borle, N. Nichols, and G. Nichols, Jr. Jour. Biol. Chem. **235**, 1206-1210, 1960.
13. Metabolic Studies of Bone **in vitro**. II. The Metabolic Patterns of Accretion and Resorption. A. B. Borle, N. Nichols, and G. Nichols, Jr. Jour. Biol. Chem. **235**, 1211-1214, 1960.
14. Some Effects of Adrenalectomy, Aldosterone and Dehydration on the Electrolyte Metabolism of Rat Renal Cortex Slices. J. Carbbe and G. Nichols, Jr. Am. Jour. Physiol. **199**, 871-875, 1960.
15. A rearrangement of the Curriculum in the Preclinical Years at Harvard. A Backward Look after Four Years of Trial. G. Nichols, Jr. Harvard Medical Alumni Bulletin, Spring, 1961.
16. Influence of Adrenal Glucocorticoids on Distribution of Calcium and Phosphorus between Bone and its Surrounding Fluids. S. Scharf and G. Nichols, Jr. Proc. Soc. Exp. Biol. and Med. **108**, 228-231, 1961.
17. Calcium Metabolism of Bone **in vitro**. Influence of Bone Cellular Metabolism and Parathyroid Hormone. S. Scharf and G. Nichols, Jr. Jour. Clin. Invest. **40**, 2083-2091, 1961.
18. Metabolic Studies of Bone **in vitro**. III. Citric Acid Metabolism and Bone Mineral Solubility. Effects of Parathyroid Hormone and Estradio. G. Vaes and G. Nichols, Jr. Jour. Biol. Chem. **236**, 3323-3329, 1961.
19. Oxygen Tension and the Control of Bone Cell Metabolism. G. Vaes and G. Nichols, Jr. Nature **193**, 379-380, 1962.







20. Exchange of Electrolytes Under Carbon Dioxide. G. Nichols, Jr. and K. E. Schaefer in **Man's Dependence on the Earthly Atmosphere**. Proc. of the First International Symposium on Submarine and Space Medicine. K. E. Schaefer, Ed., New York, The Macmillan Co., 1962, p. 145.
21. Effects of a Massive Dose of Parathyroid Extract on Bone Metabolic Pathways. G. Vaes and G. Nichols, Jr. *Endocrinology* **70**, 546-555, 1962.
22. Concerning pH Gradients between the Extracellular Compartment and Fluids Bathing the Bone Mineral Surface and Their Relation to Calcium Ion Distribution. S. Scharfman and G. Nichols, Jr. *Jour. Clin. Invest.* **41**, 1163-1168, 1962.
23. The Metabolism of Glycine-1-C<sup>14</sup> by Bone **in vitro**: Effects of Hormones and Other Factors. G. Vaes and G. Nichols, Jr. *Endocrinology* **70**, 890-901, 1962.
24. Metabolic Studies of Bone **in vitro**. IV. Collagen Biosynthesis by Surviving Bone Fragments **in vitro**. B. Flanagan and G. Nichols, Jr. *Jour. Biol. Chem.* **237**, 3686-3692, 1962.
25. Some Effects of Vitamin D. and Parathyroid Hormone on the Calcium and Phosphorus Metabolism of Bone **in vitro**. S. Scharfman, G. Vaes, and G. Nichols, Jr. *Acta Physiol. Scand.* **57**, 51-60, 1963.
26. Home Metabolism in a Mutant Strain of Rats which Lack Bone Resorption. G. Vaes and G. Nichols, Jr. *Am. Jour. Physiol.* **205**, 461-466, 1963.
27. Collagenolytic Activity in Mammalian Bone. J. F. Woods and G. Nichols, Jr. *Science* **142**, 386-387, 1963.
28. Respiratory Acclimatization to Carbon Dioxide. K. E. Schaefer, B. J. Hastings, C. R. Carey and G. Nichols, Jr. *Jour. Applied Physiol.* **18**, 1071-1078, 1963.
29. Calcium Phosphorus Metabolism in Man during Acclimatization to Carbon Dioxide. K. E. Schaefer, G. Nichols, Jr. and C. R. Carey. *Jour. Applied Physiol.* **18**, 1079-1084, 1963.
30. **In Vitro** Studies of Bone Resorptive Mechanisms. G. Nichols, Jr. AAAS Symposium. In *Mechanisms of Hard Tissue Destruction*, Am. Assoc. Adv. Science, Pub. **75**, 557-575, 1963.
31. Acid-Base Balance and Blood and Urine Electrolytes of Man During Acclimatization to CO<sub>2</sub>. K. E. Schaefer, G. Nichols, Jr. and C. R. Carey. *Jour. Applied Physiol.* **19**, 48-58, 1964.
32. Parathyroid Inhibition of Collagen Synthesis. B. Flanagan and G. Nichols, Jr. *Endocrinology* **74**, 180-186, 1964.
33. Metabolic Studies of Bone **in vitro**. V. Glucose Metabolism and Collagen Biosynthesis. B. Flanagan and G. Nichols, Jr. *Jour. Biol. Chem.* **239**, 1261-1265, 1964.
34. A Preview of the New Curriculum for the Clinical Years at Harvard. G. Nichols, Jr. *The Harvard Medical Alumni Bulletin*, Spring, 1964.
35. Collagen Biosynthesis in Bone. G. Nichols, Jr. In **The Structure and Function of Connective and Skeletal Tissues**. London, Butterworths, 1965, p. 263-277.
36. Parathyroid Influences on Bone Biosynthetic Mechanisms. G. Nichols, Jr., B. Flanagan and J. F. Woods. In: *The Parathyroid Glands: Ultrastructure, Secretion, and Function*. Gaillard, P. J., Talmage, R. V. and Budy, A.M., Eds., 1965, p. 243-334.
37. Heparin Osteoporosis. G. C. Griffith, G. Nichols, Jr., J. D. Asher and B. Flanagan. *JAMA* **193**, 91-94, 1965.
38. Metabolic Studies of Human Bone **in vitro**. I. Normal Bone. B. Flanagan and G. Nichols, Jr. *Jour. Clin. Invest.* **44**, 1788-1794, 1965.
39. Metabolic Studies of Human Bone **in vitro**. II. Changes in Hyperparathyroidism. B. Flanagan and G. Nichols, Jr. *Jour. Clin. Invest.* **44**, 1795-1804, 1965.







40. Collagenase Activity in Rat Bone Cells - Characteristics and Intracellular Location. J. R. Woods and G. Nichols, Jr. *Jour. Cell. Biol.* **26**, 747-757, 1965.
41. The Distribution of Collagenase in Rat Tissue. J.F. Woods and G. Nichols, Jr. *Nature* **208**, 1325-1326, 1965.
42. Bony Targets of Non-"Skeletal" Hormones. G. Nichols, Jr. In: *Calcified Tissues 1965*. Fleisch, H., Blackwood, H.J.J. and Owen, M., Eds. Berlin, Springer-Verlag, 1966, p. 215-226.
43. Osteoporosis - A Disorder of Bone Cell Metabolism. - G. Nichols, Jr. and B. Flanagan. *Fed. Proc.* **25**, 922-927, 1966.
44. Diurnal Periodicity in the Metabolic Activity of Bone Tissue. D. Simmons and G. Nichols, Jr. *Amer. Jour. of Physiol.* **210**, 411-418, 1966.
45. Metabolic Bone Disease: General Consideration. G. Nichols, Jr. In: **Principles of Internal Medicine**, Harrison, McGraw-Hill, Inc., 1966, p. 1330-1335.
46. Significance of Collagenase in Human Bone. G. Nichols, Jr. **Fourth European Symposium on Calcified Tissues**. Abridged Proceedings, New York, Excerpta Medica, 1966, p. 81-82.
47. Discussion Leader. Proceedings of the Second Conference on **Biology of Hard Tissues**. A. M. Budy, Ed. March 6-9, 1966. National Aeronautics and Space Administration, 1968.
48. Parathyroid Hormone Effects on Amino Acid Transport into Bone Cells. J. P. Rosenbusch and G. Nichols, Jr. *Endocrinology* **81**, 553-557, 1967.
49. Active Transport of Amino Acids into Bone Cells. J. P. Rosenbusch, B. Flanagan and G. Nichols, Jr. *Biochim. Biophys. Acta* **135**, 732-740, 1967.
50. Kinetics of Synthesis of Ribonucleic Acid in Normal Bone **in vitro**. Demonstration of a Rapidly-Labelled Component. J. Steinberg and G. Nichols, Jr. *The Biochemical Journal* **105**, 843-856, 1967.
51. Normocalcemic Hyperparathyroidism. G. Nichols, Jr. and B. Flanagan. *Trans. of the Assoc. of Amer. Physicians* **XXX**, 314-321, 1967.
52. Discussion. G. Nichols, Jr. In: *Education in the Rheumatic Diseases*. G. H. Stollerman, Ed. New York, The Arthritis Foundation, 1967, p. 244-245.
53. Stimulation of bone RNA Synthesis by Parathyroid Hormone. J. Steinberg and G. Nichols, Jr. In: **Parathyroid Hormone and Thyrocalcitonin (Calcitonin)**. New York, Excerpta Medica Foundation, 1968, p. 226-241.
54. The Entry of Sugars into Bone Cells. L. Dos Reis, J. P. Rosenbusch and G. Nichols, Jr. *Biochim. Biophys. Acta* **150**, 311-314, 1968.
55. The Quantitative Measurement of Bone Resorption and Balance **in vitro** by Analysis of Hydroxyproline Metabolism. B. Flanagan and G. Nichols, Jr. *Calc. Tiss. Res. Supp. to Vol. 2*, 51-51B, 1968.
56. Metabolic and Histologic Changes in Femoral Neck Fractures Leading to Aseptic Necrosis. R. V. Cronk, B. Flanagan, G. Nichols, Jr. and H. H. Banks. *Surgical Forum*, Vol XIX, 54th Annual Clinical Congress 1968, American College of Surgeons, Chicago, October 1968, p. 457-458.
57. Distortions of Normal Bone Cell Metabolism induced in Multiple Myeloma. G. Nichols, Jr. and P. Cohen. *Metabolism* **18**, 38-49, 1969.
58. Metabolic Studies in Two Boys with Classical Progeria. D. B. Vilee, G. Nichols, Jr. and N. B. Talbott, *Pediatrics*, Vol 43, No. 2, p. 207-217, 1969.
59. Bone Matrix Turnover and Balance **in vitro**. I. The Effects of Parathyroid Hormone and Thyrocalcitonin. B. Flanagan and G. Nichols, Jr. *Jour. Clin. Invest.* **48**, 595-606, 1969.







60. Bone Matrix Turnover and Balance **in vitro**. II. The Effects of Ageing. B. Flanagan and G. Nichols, Jr. *Jour. Clin. Invest.* **48**, 607-612, 1969.
61. Metabolic Bone Disease: General Consideration. G. Nichols, Jr. **Principles of Internal Medicine**, Harrison (Sixth Edition McGraw Hill, Inc., 1969, p. 1918-1923.
62. Vitamin D. Deficiency and Hypervitaminosis D. G. Nichols, Jr. **Principles of Internal Medicine**, Harrison (Sixth Edition) McGraw Hill, Inc. 1969, p. 411-417.
63. Distortions of Normal Bone Cell Metabolism in Uremia and Their Cause. G. Nichols, Jr., B. Flanagan, and J. Sluys Veer. *Arch. Int. Med.* **124**, 530-538, 1969.
64. Fluoride Treatment of Bone Rarefaction in Multiple Myeloma and Osteoporosis - A Review. P. Cohen, G. Nichols, Jr. and H. H. Banks. *Clin. Orthop.* **64**, 221-249, 1969.
65. Calcium and CNS Symptoms. G. Nichols, Jr. *New England Jour. Med.* **281**, 271, 1969.
66. Bone Metabolism in Osteoporosis. B. Flanagan, S. Ault, and G. Nichols, Jr. In: **Osteoporosis**, U. S. Barzel, Ed. New York, Grune & Stratton, 1970, 0. 217-237.
67. Bone Resorption and Calcium Homeostasis: One Process or Two? G. Nichols, Jr. *Calc. Tiss. Res.* **4** (Supplement), 61-63, 1970.
68. Inflammation and Bone. G. Nichols, Jr. In: **Immunopathology of Inflammation**. A. Bertelli and J. C. Jouck, Eds. Excerpta Medica, p. 229-242, 1971.
69. Mechanisms for the Transfer of Calcium into and out of the Skeleton. G. Nichols, Jr. and P. Rogers. *Pediatrics*, Vol 47, No. 1, Part II, p. 211-228, 1971.
70. Differential Stimulation by Parathyroid Hormone of Bone and Kidney Ribonucleic Acid Synthesis. J. Steinberg and G. Nichols, Jr. *J. Endocr.* **49**, 493-506, 1971.
71. A Comparative Study in Bone and Kidney of Nucleotide and RNA Synthesis. J. Steinberg and G. Nichols, Jr. *Biochim. Biophys. Acta* **228**, 173-182, 1971.
72. Phospholipid - Calcium Phosphate Complex: Enhanced Calcium Migration in the Presence of Phosphate. J. M. Cotmore, G. Nichols, Jr. and R. E. Wuthier. *Science* **172**, 1339-1341, 1971.
73. Bone Cells, Calcification and Calcium Homeostasis. G. Nichols, Jr., P. N. Hirschmann, and P. Rogers. In: **Cellular Mechanisms for Calcium Transfer and Homeostasis**, G. Nichols, Jr. and R. H. Wasserman, Eds. Academic Press, 1971, p. 211-237.
74. Metabolic Studies of Bone in Uremia Before and After Treatment. G. Nichols, Jr., B. Flanagan, J. van der Sluys Veer, J. W. Johnson, C. L. Hampers, and J. P. Merrill. *Metabolism* **21**, 317-328, 1972.
75. The Isolation and Partial Characterization of a Calcium-Rich Particulate Fraction from Bone Cells. P. H. Hirschmann and G. Nichols, Jr. *Calc. Tiss. Res.* **9**, 67-69, 1972.
76. Bone Cell Calcium Stores: Their Size, Location, and Kinetics of Exchange. G. Nichols, Jr. and P. Rogers. *Calc. Tiss. Res.* **9**, 80-94, 1972.
77. Introductory Remarks. G. Nichols, Jr. In: **Calcium, Parathyroid Hormone and the Calcitonins**. Amsterdam, Excerpta Medica, 1972, p. 305-306.
78. Introductory Remarks. G. Nichols, Jr. In: **Calcium, Parathyroid Hormone and the Calcitonins**. Amsterdam, Excerpta Medica, 1972 (Different from #77).







79. The Transfer of Calcium into and out of the Skeleton of Normal and Uremic Subjects. G. Nichols, Jr. In: **Rein et Calcium**, D. Hioco, ed. Sandoz Editions, 1972, P. 27-45.
80. Osteoporosis: A Status Report. G. Nichols, Jr., B. Flanagan, M. Federman. and D. H. Henneman. IV International Congress of Endocrinology. Amsterdam, Excerpta Medica, 1972, p. 1180-1185.
81. Variants in Osteomalacia. B. Flanagan, S. Ault, M. Federman and G. Nichols, Jr. In: **Clinical Aspects of Metabolic Bone Disease**, Boy Frame, A. M. Parfitt and H. Duncan, Eds. Amsterdam, Excerpta Medica, 1973, p. 397-402.
82. Voyage to Enchantment. G. Nichols, Jr., M. D. Harvard Medical Alumni Bulletin. Boston, May/June 1973, p. 30-31.
83. Cruise and Race - on the Same Boat. G. Nichols, Jr., M.D. Sail Magazine. Boston, September 1974, p. 68.
84. Bone Cell Cilia: Vestigial or Functional Organelles? Micheline Federman and George Nichols, Jr., Calcif. Tiss. Res. **17**, 81-85, 1974.
85. Eschrichtius Robustus. G. Nichols, Jr. Oceans. Stamford, Conn., May/June 1975, p. 61.
86. Battening Down. G. Nichols, Jr., M.D. Sail Magazine. In: Safety and Seamanship. Boston, July 1975, p. 75.
87. Fear: A Constant Shadow at Sea, G. Nichols, Jr., M.D. Sail Magazine, Boston, January, 1976.
88. Sailing and Science, A Cruise after Whales, G. Nichols, Jr., M.D., Sail Magazine, Boston, May, 1976.
89. Readyng for Sea, G. Nichols, Jr., M.D., Sail Magazine, Boston, July, 1976.
90. Winter Passage, G. Nichols, Jr., M.D., Sail Magazine, Boston, December, 1977.
91. Yankee Whaling - Fifty Years Later, G. Nichols, Jr., M.D., Oceans, San Francisco, March-April, 1978.
92. Western North Atlantic Humpback Whales, Balcomb, K.C., Nichols, G., Jr., M.D., Scientific Report IWC, 7 pp., 1978.
93. Preliminary Report on the Populations of Humpback Whales on Silver, Navidad, and Mouchoir Banks during the Winter, 1977-1978, Whitehead, Hal; Baxter, Benjamin A.; and Nichols, G. Jr., M.D., Scientific Report, IWC, 1978.
94. Krill Availability and the Distribution of Humpback Whales in Southeastern Alaska, Bryant, P. J.; Nichols, G.; Bryant, T. B.; Miller, K., J. Mamm., 62(2):427-430, 1981.
95. Humpback Whales (**Megaptera Novaeangliae**) off the West Coast of Greenland: An Ecological Study, Perkins, J. S.; Bryant, P. J.; Nichols, G.; Patten, D. R., submitted to Can. J. Zool., 1981.
96. Humpback Whale Censuses in the West Indies, Balcomb, K. C., Nichols, G., Jr., M.D., Scientific Report IWC, 32:401-406, 1982.

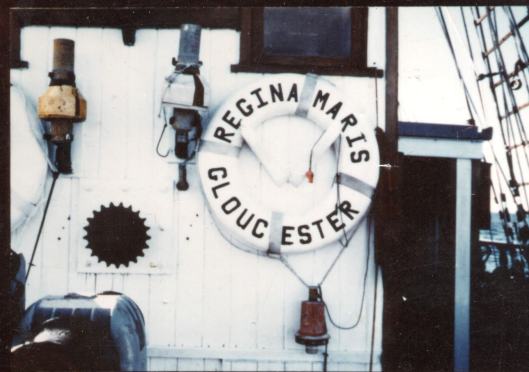
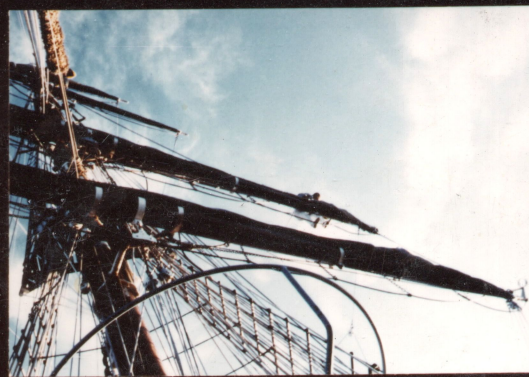












OCEAN RESEARCH AND EDUCATION SOCIETY, INC.